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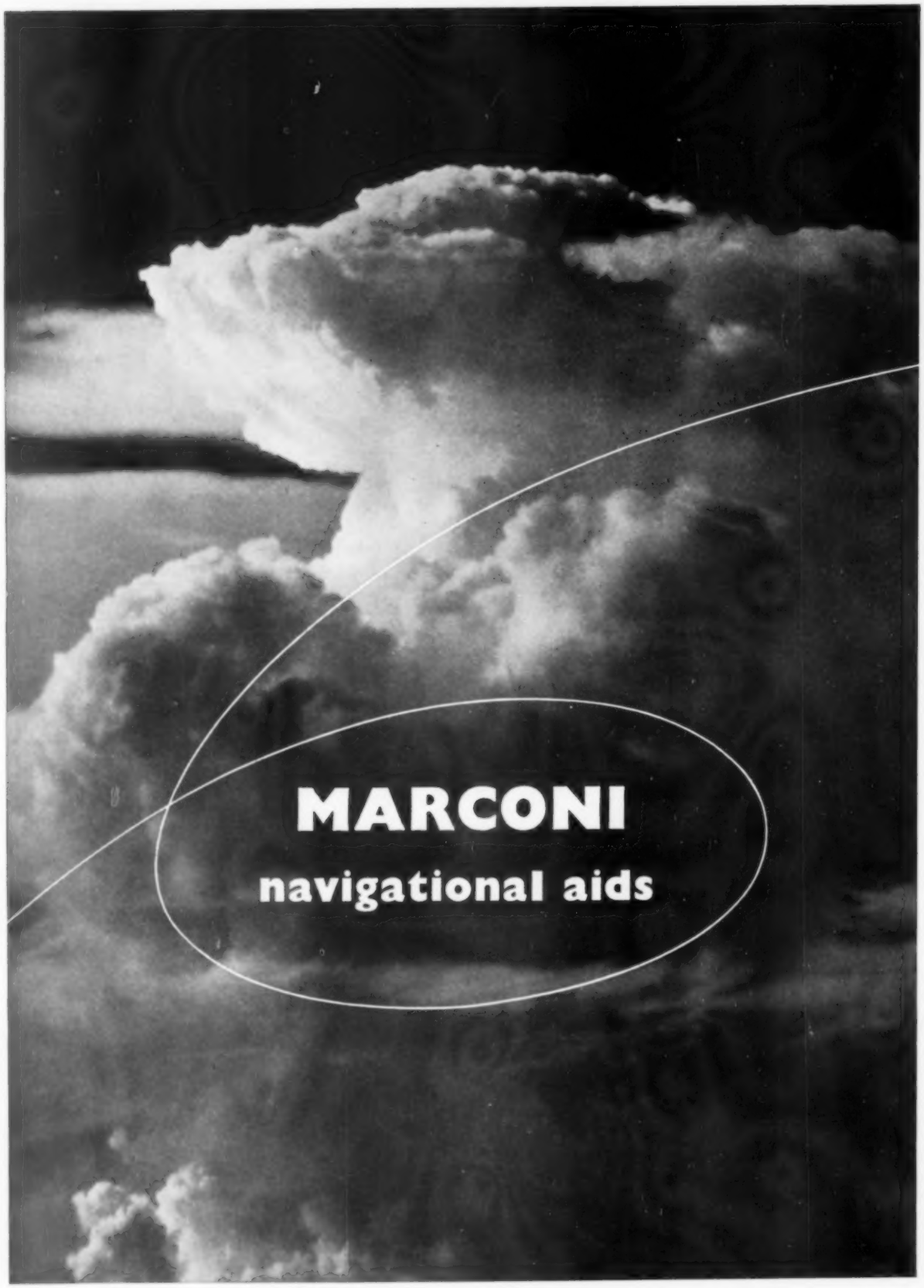

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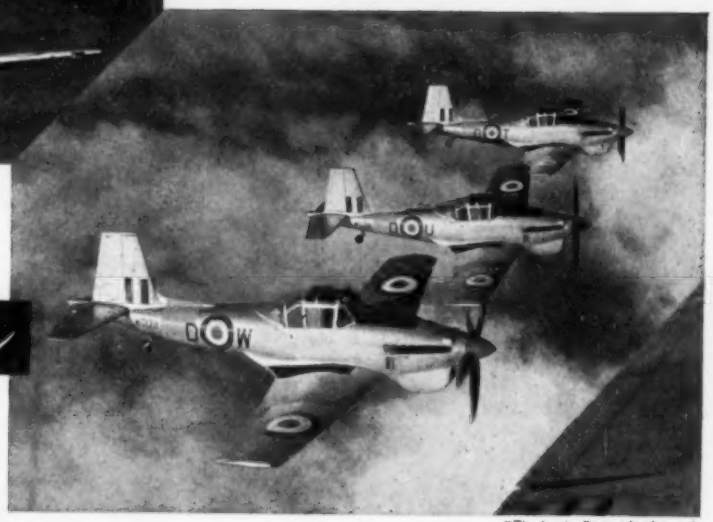

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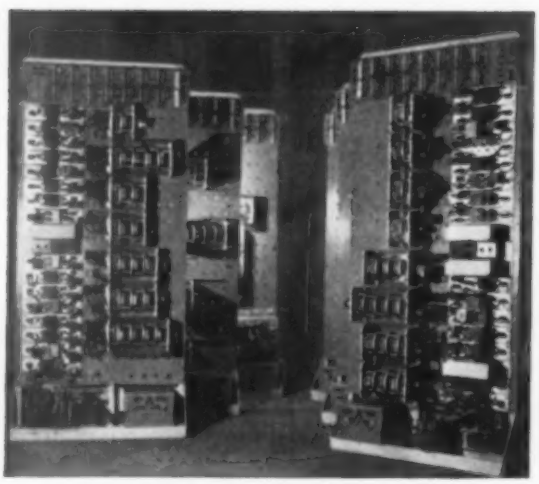

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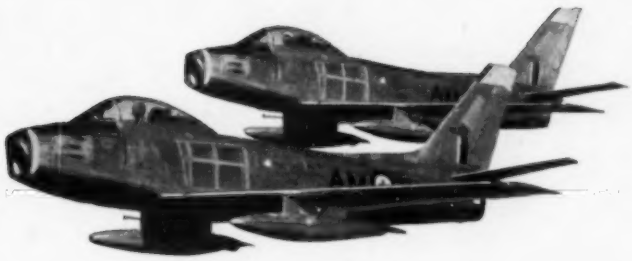
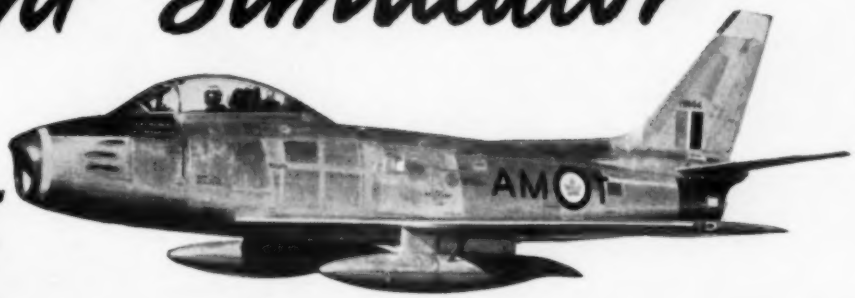


Flight Simulator



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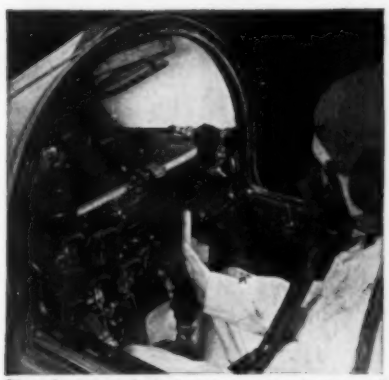

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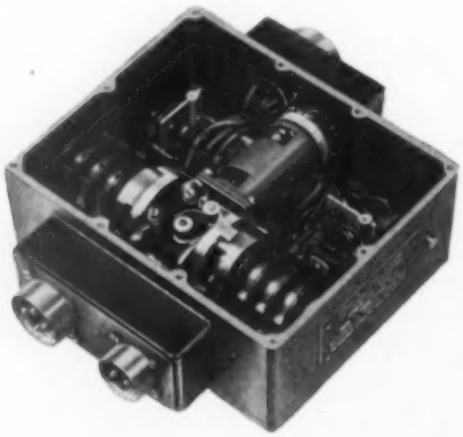

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off 90 secs.
Air Intakes on 20 secs.
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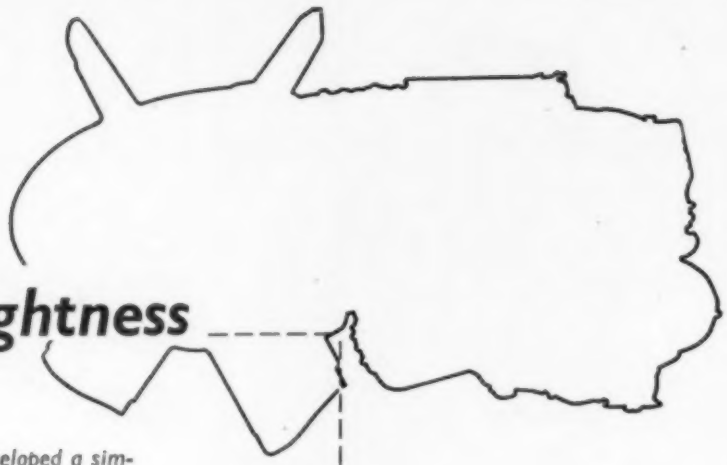

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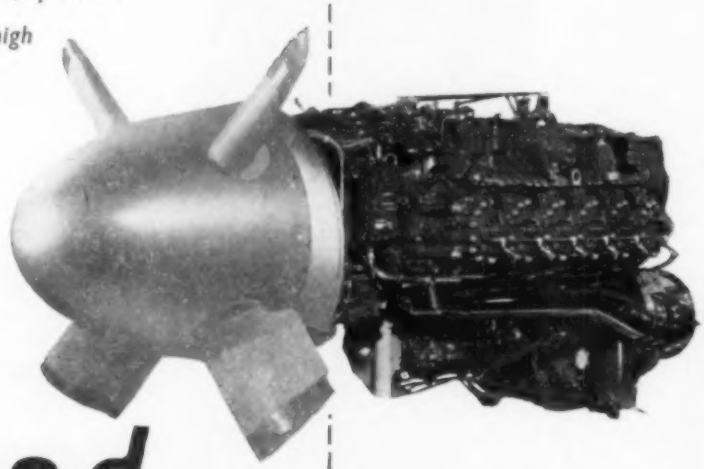

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EDITOR
MAURICE A. SMITH, D.F.C.

ASSISTANT EDITOR
H. F. KING, M.B.E.

ART EDITOR
JOHN YOXALL

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Deep-Sea Reconnaissance

A STORY in this issue gives the most intimate picture to date of life in a Coastal Command Shackleton. Being mainly concerned with domestic matters aboard —particularly bodily comforts—it touches but little on operational aspects, nor does it aim to consider the Shackleton's status *vis-à-vis* other types and classes of maritime aircraft. So let it be said here and now that the Shackleton is today the pre-eminent land-based anti-submarine aircraft, not only in R.A.F. Coastal Command, but in the world.

In advancing this opinion we do not fail to recognize the manifold virtues of America's record-breaking Lockheed Neptune—a "twin" of remarkable versatility but lacking the four-engine safety and barn-like roominess of the massive Avro. Already the Neptune is in service with American, British, Australian and Dutch squadrons, and production continues unabated, while the Shackleton is as yet to be seen only in R.A.F. markings. *Flight* has already reported, however, that the Manchester product has been adopted by South Africa—and that it is well suited for further development (a nosewheel Mk 3 variant is said to be in hand) is evident from the most superficial inspection.

For those air forces which are already demanding—and can afford—something even more modern than a developed Shackleton, Britain now offers the "M.R." version of the Bristol Britannia, to be built by Canadair for the R.C.A.F. Thus, in respect of shore-based, maritime-reconnaissance/anti-submarine machines we doff our national sailor-caps to nobody. Would that the same were true of the water-based aircraft for similar duties; but the dismal fact is that, while America vigorously pursues development of flying-boats, we ourselves continue to rely solely upon that crusted old shellback the Sunderland. The magnificent turboprop proposals by Saunders-Roe and Short remain as models and artist's impressions, to be admired, coveted and—in some quarters (so uncertain is their future)—already mourned.

On The Air

RECENTLY we published the news that public-address equipment—or passenger-announcement equipment, as British manufacturers prefer to call it—has been ordered for B.E.A.'s Viscounts and Elizabethans and for the Britannias of B.O.A.C. Although not previously fitted to British airliners, such equipment has been carried for some years by most large American transports.

It has also been reported that B.E.A. stewardesses are being taught the elements of microphone technique. Captains are already accustomed to using their R/T microphones, but it occurs to us that they too might benefit from some official guidance in their approach towards broadcasting to passengers *en route*. The other day we flew with an American captain who gave an excellent demonstration of how the microphone can establish a link between cockpit and cabin even though, on this occasion, the aircraft was too large and the journey too short for him to make a personal tour of the cabin. He began with "Good afternoon, ladies and gentlemen: this is Captain —— speaking from the flight deck . . ." and proceeded to give our location, height, speed, estimated time of arrival and a report on the weather at our destination. Then followed a lucid but non-technical explanation of how and why the airscrews were used to provide reverse thrust on landing.

There is a lot to be said for telling the passenger something about the aircraft in which he is travelling, and perhaps about air-traffic procedures generally, as well as broadcasting straightforward details of the progress of the flight and of interesting landmarks below. Even a two-minute speech from the captain can generate a great deal of confidence, and, when the occasion arises, dispel the depressing effects of a bumpy or monotonous ride.

The idea of passing on advance information about the weather also seems commendable. If told by the captain that the destination is overcast, entailing a descent through cloud, the passenger relaxes in the knowledge that the crew are prepared for and in command of the situation; otherwise, his natural reaction might be to peer anxiously into the surrounding murk, wishing he had stayed on *terra firma*.

FROM ALL QUARTERS

"Flight" photograph

IN A WINTER DAWN at Hatfield, the first Series 2 Comet taxies out in preparation for its record-breaking journey to Khartoum. The story of the flight, with further pictures, is on p. 135.

Proving the Royal Route

ON January 11th members of the Australian Department of Civil Aviation took off from Essendon to begin a series of comprehensive proving flights over all the air routes included in the Royal Tour of the Commonwealth. Her Majesty the Queen and H.R.H. the Duke of Edinburgh are due to arrive in Sydney on February 3rd; before sailing for Colombo on April 1st they will travel 10,000 miles by air alone during their stay in the Commonwealth. The number of flights involved is 35, of which 28 will be made in specially equipped Dakotas of the R.A.A.F., the remainder being in civil aircraft.

Each proving flight will simulate the arrival and departure of the royal aircraft and the attendant machines. Headquarters and regional experts from the Civil Aviation Department will check every detail, including the placing of aircraft on the hard-standing and the freedom of movement for the royal party and reception groups to and from the terminal building.

Prof. Heinkel and the Comet

SOME ill-informed German newspaper comments on the recent Comet accident have been effectively countered by Professor Ernst Heinkel. Refuting the view attributed to his former chief pilot, Herr Nitschke, that the Comet was put into service too soon, Prof. Heinkel recalled his first sight of the aircraft—at Farnborough in 1952: "I was tremendously impressed by the classical line and beauty of the Comet, for which I then prophesied a great future . . . I still think it has such a future."

Aircraft-Carrier Pioneer

THE Duke of Montrose, who died in Stirlingshire on January 20th at the age of 75, was generally credited as "the inventor of the aircraft carrier." In 1912, as a director of William Beardmore and Co., Ltd., Dalmuir, he played a considerable part in the design of a 14,450-ton vessel intended for delivery to the Italian Lloyd Sabaudo Line as the s.s. *Conte Rosso*. When war broke out in 1914, work on the vessel ceased. Two years later it was resumed; she was to be converted into an aircraft carrier. It is said that the Duke—who had served in merchant vessels, and was later to serve in the Auxiliary Naval Service, and eventually in the R.N.V.R.—was responsible for the conversion plans, which he first laid before the Admiralty in 1912.

The conversion work was completed in September 1918 and the vessel was commissioned as H.M.S. *Argus*—the first true "flat top." After modification in 1920 to carry about 20 aircraft she was re-commissioned in 1921, and remained in service until 1947.

I.A.S. Honours Britons

OF the two Honorary Fellowships conferred each year by the Institute of the Aeronautical Sciences, one—the Foreign Honorary Fellowship—has been awarded (as already reported in our pages) to Sir William Farren, C.B., M.B.E., M.A., F.R.S., M.I.Mech.E., F.R.Ae.S., technical director of A. V. Roe and Co., Ltd., and president of the Royal Aeronautical Society. The other goes to Mr. Preston Bassett, president of the Sperry Gyroscope Co. in America.

After news of the honour had been conveyed to him in London, Sir William said that the award was particularly gratifying to him because of the high regard Britain and America had for each others' achievements in aviation.

One of the ten Fellowships awarded by the I.A.S. for 1953 also comes to this country—to Mr. N. E. Rowe, C.B.E., D.I.C., B.Sc., A.C.G.I., M.I.Mech.E., M.Inst.T., A.F.I.A.S., F.R.Ae.S., technical director of Blackburn and General Aircraft, Ltd. There are two other recipients outside the United States: Mr. L. P. Coombes, Director of Aerodynamics at Australia's Aeronautical Research Laboratories, and M. Maurice Roy, head of ONERA—the French National Office of Aeronautical Study and Research.

R.O.C. Winners in Recognition Contest

SIXTY-FIVE teams, each of three members, took part in the Aircraft Recognition Society's seventh annual All-England Contest, held last Saturday in the London lecture hall of the Royal Society. Competitors were required to identify 35 types of aircraft from photographs projected on a screen for a period of one second or less.

It was generally agreed that the contest was an even sterner test than last year's, an opinion confirmed by the lower average scores returned. The inclusion of several pre-war types, and of

REMEMBERING "R.J." : Among the many present at Southampton to honour the memory of R. J. Mitchell were (left to right) his son, Dr. Gordon Mitchell; Air Marshal Sir John Boothman, A.O.C-in-C. Coastal Command, and Schneider Trophy winner in 1931; Sir William Farren, president of the R.Ae.S. and technical director of A. V. Roe and Co., Ltd.; Mr. Joe Smith, chief designer of Vickers Supermarine, who had delivered the first Memorial Lecture before the Southampton Branch of the R.Ae.S.; A.V-M. S. N. Webster, R.A.F., ret., Schneider Trophy winner in 1927; and A.V-M. R. L. R. Atcherly, a member of the Schneider Trophy team in 1929, until recently A.O.C. No. 12 Group, R.A.F., and now appointed Head of the Air Force Staff, British Joint Services Mission (U.S.A.) in Washington.

PROTECTIVE CUSTODY: In dry dock at B.E.A.'s engineering base, London Airport, are nine Vikings and eight Admirals—now being Cocooned after withdrawal from service. Elizabethans and Viscounts have taken over nearly all the overseas and some of the domestic routes, but 20 Admirals remain in service.

others which had only a brief existence, made things particularly difficult for the overseas competitors, and for youngsters without a first-rate knowledge of aircraft history.

The teams represented units of the Army, Royal Air Force, Royal Observer Corps, Air Training Corps, the Combined Cadet Force, and the Women's Junior Air Corps; also competing were several civilian clubs, two units of the U.S. Army stationed in this country, and the Aircraft Recognition Wing of the Royal Netherlands Air Force Intelligence School.

As detailed below, the Silver Hurricane Trophy for the best team performance went to Post 5/C4 of the Royal Observer Corps, with 86 points out of a possible 105.

In presenting the prizes to the winners, Mr. Peter Masefield, President of the Aircraft Recognition Society, congratulated the teams on their prowess. While the cards were being checked, Mr. Frank Hillier, Secretary-General of the Air League of the British Empire, spoke briefly but convincingly about the vital need for this country to be strong in the air. His talk was followed by the showing of the Shell film *Powered Flight: The Story of the Century*, and from comments heard afterwards it was plain that the film had made a deep impression upon the audience, few of whom were born when most of the events recorded took place.

RESULTS

Silver Hurricane Trophy (best team).—Post 5/C4 (St. Albans), Royal Observer Corps (Ldg. Obs. D. S. Skeggs, Obs. F. P. Wallace, Obs. Nigel Price); 86 points out of possible 105.

Silver Heracles Trophy (best A.T.C. team; trophy presented by Sir Frederick Handley Page).—No. 4 (F) Ilford Squadron, A.T.C. (Sgt. D. C. Potten, Cdt. R. J. Croxon, Cdt. R. Banham); 74 points out of possible 105.

Air Pictorial Bowl (highest individual score).—Nigel Price, a member of the winning R.O.C. Team; 30 points out of possible 35.

Wren Award (a coloured caricature of the Hawker Hunter by cartoonist Chris Wren).—Aircraft Recognition Wing of R.N.A.F. Intelligence School (Lt. A. P. De Jong, Lt. N. B. W. Bizot, Sgt. J. A. Musters); 32 points.

Cold Starts

DUE back at Wisley at mid-week was the prototype Vickers-Armstrongs' Viscount G-AMAV—of New Zealand Race fame—after a week in search of really cold weather in Scandinavia. Arriving at Bromma, Stockholm, on the 20th, it went on next day to Gardermoen and Fornebu, near Oslo.

The object was not to test cold-weather performance in general—this was done very satisfactorily during the six weeks which the same aircraft spent in Canada early last year—but to try a new battery which its manufacturers believe will be very suitable for starting the Viscount's Darts. Made by the Varley Dry Accumulators, Ltd., this 24v 25 amp hr battery is claimed to have particularly high rates of discharge and recovery.

The pilot on the Scandinavian trip was Stewart Sloane, a Vickers-Armstrongs' test pilot; the navigator was D. Jones and the engineer was E. W. Walker—who was on board -AV for the New Zealand Race.

Lancaster Gets Bunkered

LAST Friday, January 22nd, an Avro Lancaster of the M.o.S. was force-landed on a golf course near Nottingham, after suffering total loss of power while approaching to land at Hucknall. The aircraft, which was returning to the Rolls-Royce airfield after a routine instrument-testing flight, first "lost" its port engines at about 500ft, followed by those on the starboard side; the pilot, W/C. J. H. Heyworth, skilfully put the aircraft down "in the rough," though he hit a tree in the process, suffering an injured hand. Three Rolls-Royce technicians who were on board, J. Dye, M. Costello and W. D. Edmenson, were unhurt.

John Harvey Heyworth is, of course, Rolls-Royce's chief test pilot. He had returned to active flying only a month previously, after having spent over three months convalescing from injuries he received in the crash of a Bristol Sycamore helicopter at Farnborough last autumn, in which he was a passenger. He is now rapidly recovering from this latest incident and hopes to resume active flying shortly.

More Guidance for the Plain Man

LAST week a short summary of missile homing systems (passive, active, semi-active and beam riding) appeared in these pages under the heading *The Plain Man's Guide to Guidance*. Here, from the same source, is a brief account of the flight control systems used in the missile itself.

A guided missile normally attains supersonic speed a few seconds after launching, and maintains it throughout its flight. For this reason the lifting surfaces are small, sharp-edged and extremely thin. Yet these small surfaces, which resemble fins rather than wings, can produce forces of from 7 to 20 g. There are two principal methods by which the missile's flight path is controlled—the Cartesian and the polar.

Missiles employing the Cartesian system have two sets of wings arranged as a cross round the fuselage with movable control surfaces fitted to the trailing edges. Flight is controlled by gyros. One pair of surfaces governs direction and the other elevation. In a turn, the missile is merely wrenched round by the directional controls without the banking associated with a normal aircraft turn.

In the polar system, the missile has only two wings, each with two control surfaces acting independently in the same way as the ailerons and elevators of conventional aircraft. The control gyros, directed by the missile's homing and ranging mechanism, maintain the wings at right angles to the target's flight path. Directional deflection is achieved solely by the elevators. The direction of a turn is selected by rolling the missile with the ailerons. The polar system is sometimes called "twist and steer" control.

The simplest missiles have all-moving wings which combine the function of lift-producing surfaces with controls. The linkage between gyros and surfaces is similar to that employed between autopilot and controls in a conventional aircraft; the missile's system is, of course, much more compact and capable of withstanding very high g forces.

TWIN DOUBLE WASPS power the Sikorsky XHR2S helicopter of the U.S. Marine Corps. This machine, seen with undercarriage retracted, bears the Sikorsky designation S-56 and is briefly described on page 129. Since that description was prepared, however, it has been stated by the Sikorsky organization that the top speed is "well over 150 m.p.h.," and that the XHR2S will carry "two combat assault squads—that is, about 26 fully equipped men."

IN MEMORY OF R. J. MITCHELL

Vickers-Supermarine Designer, in R.Ae.S. Lecture, Pays Tribute to his Predecessor

R. J. Mitchell—an early portrait.

A FILM, books and articles since the war have all helped to make R. J. Mitchell into something of a legendary figure, not only in aviation, but in the eyes of the general public as well. This has happened to others who have played an important part in their country's history, but seldom so deservedly as in the case of the man who is always gratefully remembered by the British people as "the designer of the Spitfire."

The value of his work, not only in relation to the Spitfire, but to other aircraft as well, received a most authoritative assessment on Thursday of last week, when the first Mitchell Memorial Lecture was delivered before the Royal Aeronautical Society by Mr. Joseph Smith, C.B.E., F.R.Ae.S., A.M.I.Mech.E., chief designer to Vickers - Armstrongs' Supermarine works. The selection of a venue was as appropriate as the choice of speaker: though one of the Society's "main" fixtures, the lecture was given, under the auspices of the R.Ae.S. Southampton branch, at Southampton University—in the part of England in which Mitchell gained his fame. The lecture, incidentally, was the second of the Society's "memorial" series; the Rex Pierson Lecture was given in 1952, and the next—to be given in the Bristol area—will recall the achievements of F. S. Barnwell.

Before the delivery of the lecture the president of the Society, Sir William Farren, was welcomed, as were the other guests, and a report was given by Mr. D. B. Smith on the activities of the Southampton branch and the organization of the lecture. The University gymnasium, where the lecture was delivered, was filled to capacity by visitors, admirers and friends of R. J. Mitchell who had travelled from all parts of the country; by the members representing at least five aircraft organizations in the area; and by visiting members from the newly formed Boscombe Down branch. During the course of the lecture a remarkable recording of Mitchell's voice was broadcast.

The lecturer began by saying that, with recollections of fourteen years of contact with Mitchell, he felt rather in the position of a son speaking of his late father; and, indeed, Mitchell certainly was the "father" of the present Supermarine design team.

Reginald Joseph Mitchell, the eldest of five children of a Yorkshire schoolmaster, was born at Talke, near Stoke-on-Trent, in 1895. The boy, at an elementary school at Longton, and later at Hanley High School, early developed a mechanical mind, and boyhood friends recall that one of his principal hobbies was the making of model aeroplanes.

At the age of sixteen he left school and was apprenticed to an engineering firm, Kerr Stuart and Co., engaged on locomotive production. He passed through the shops as an engineering apprentice and finally into the drawing office. He became a skilled mechanic, keen enough to install a lathe in his bedroom. During this period he attended evening technical classes and later became a part-time teacher in one of the technical colleges.

In 1917, at the age of 22, he applied for and obtained a job with Hubert Scott-Payne at the Supermarine Aviation Works, Southampton.

Mr. J. Smith delivering the Memorial Lecture. The Spitfire model is a reminder of the magnificent contribution made by the lecturer himself to the development of Mitchell's famous fighter.

Scott-Payne first gave his new employee a job as his personal assistant, but in the middle of 1918 transferred him as assistant to Mr. Leach, the works manager. When Mr. Hargreaves, chief designer, left the firm in 1919, Mitchell returned to the drawing office as chief designer, and in 1920, at the age of 25, was also appointed chief engineer. It was about this period that he married the headmistress of Dresden Junior School, and began a happy domestic life which lasted till his death. His son, Gordon, was born in 1921.

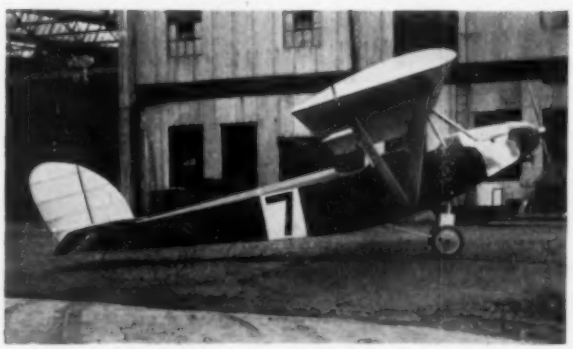
In 1923, Scott-Payne left Supermarine for other spheres in the aeronautical world, and the management of the enterprise was taken over by Sqn. Cdr. James Bird, who had joined the company in 1919. Bird gave Mitchell his head, and he remained chief engineer and chief designer until 1928. The firm was then taken over by Vickers, and shortly after, Mitchell was appointed director and chief designer, which position he held until his death in 1937.

He was elected a Fellow of the R.Ae.S. in 1929, and was an associate member of the Institute of Civil Engineers. In 1932 his services to his country were recognized by his appointment as a Commander of the Order of the British Empire. He was a member of the Air League and a founder-member of the Hampshire Aeroplane Club, where he learned to fly, obtaining his pilot's licence in 1934.

Having given his audience the background of Mitchell's career—which we have summarized in the foregoing paragraphs—the lecturer now turned to his subject's personality. "R. J.," he said, "was a well-built man, pleasant-faced, of medium height and fair colouring, with a very determined chin. He possessed great charm, an engaging smile which was often in evidence and which transformed his habitual expression of concentration. He was rather shy with strangers, although preserving an outwardly easy manner, and only when one came to know him well did his chief characteristics become evident."

Foremost among these characteristics was a clear-thinking ability to create, which made him a designer in the truest sense of the word. This creative ability was the driving force of his life. The next most important characteristic was his capacity for leadership. He never shirked full responsibility, and his technical integrity was unquestioned. He won the complete respect and the confidence of his staff, in whom

Immediately below is the Supermarine Competition Amphibian which, in 1920, was awarded a special Air Ministry prize. This machine was described by Mr. Smith as Mitchell's first success. Indicative of his versatility is the dainty lightplane on the right, the Sparrow (in monoplane form).



Last of Mitchell's big flying-boats was the twin-Pegasus Stranraer of 1935, depicted on the left. Until very recently this type was still flying in Canada —indeed it may even yet be flying there. On the right is the S.4 racing seaplane, ill-starred but a notable technical achievement. Stressed-skin wooden construction and trailing-edge flaps were used. R. J. Mitchell is in the centre of the group.

he created a continuous sense of achievement; but, in spite of being the unquestioned leader, he was always ready to listen to and consider another point of view, or to modify his ideas to meet any technical criticism which he thought justified. The effect of this attitude on the team of young and keen engineers which he collected around him could well be imagined.

Mr. Smith recalled that "R. J. had a good sense of humour—or, perhaps I should say, of fun—and a capacity to relax completely. If you were away on a business visit with him and the day's work over, there was always the possibility of some prank developing . . . on such occasions as the annual drawing-office dinner . . . he became the ringleader in any sort of fun and games, usually aided and abetted by the firm's test pilots." His sports and pastimes included tennis, golf, sailing and snooker.

After further reminiscences of his association with "R. J.," the lecturer spoke of "another very human aspect of the man"—his state of mind during flight trials of a prototype: "One did not indulge in silly chatter in light-hearted manner on such occasions. He was always worried for the safety of his pilots, and, although he witnessed the first flights of so many aircraft, he never grew accustomed to it. During such periods as the testing of Schneider Trophy machines he was in a continual state of tension lest a pilot be injured or killed, and felt that he carried a personal responsibility in the matter."

He was an inveterate "drawer on drawings," particularly general arrangements. He would modify the lines of an aircraft with the softest pencil he could find, and then re-modify over the top with progressively thicker lines, until there was finally a new outline of lines about three-sixteenths of an inch thick. But the results were always worth while, and the centre of the line was usually accepted when the thing was re-drawn.

When in the throes of a new design, the arrangement of which had been decided, he would spend almost all his time in the drawing office on the various boards. Here he would argue out the details with the draughtsmen concerned, showing a complete grasp of the whole aircraft.

Construction of the machine having begun, he would spend some time each day examining and assessing the result. If he was not satisfied with the way something had turned out, he would go back to the drawing office and, having discussed the matter with the people concerned, either modify it or leave it, as the case might be. Always the practical aspects of the proposed alteration would be borne in mind in relation to the state of the aircraft, and to the ability of the works to carry out the change.

Mitchell's Technical Achievements

At this point in his sketch of Mitchell's personality the lecturer turned to his courage in the illness that beset him with increasing severity; but here, first, we summarize Mr. Smith's review of the technical achievements for which "R. J." was responsible. The lecturer reminded his audience that Mitchell designed bombers, flying-boats, amphibians, racing seaplanes, fighters and even light aeroplanes. Detailed reference to all these was made in *Flight* of October 2nd last year, but a resumé of Mr. Smith's remarks follows.

In 1920 appeared a pusher amphibian, designed for an Air Ministry competition in which it gained a special prize. This was Mitchell's first success. In 1921 came the Seal (afterwards Seagull) and the Sea King II fighter amphibian, capable of being looped, rolled and spun. This was followed in 1922 by the Sea Lion II, which won the Schneider Trophy at 145 m.p.h., and in 1923 by the Sea Lion III, which, though it attained 175 m.p.h., was beaten by the American Curtiss floatplanes. Another 1923 product was the Sea Eagle commercial amphibian, followed by the somewhat similar military Scarab (1924). The big Swan twin-engined amphibian of 1924, Mr. Smith recalled, was the forerunner of the Southampton. He quoted *Flight* of July 3rd, 1924, as saying: "Mr. R. J. Mitchell is now regarded as one of our foremost flying-boat designers." For the 1924 Lympne Competition, Mitchell produced the tiny Sparrow, which weighed under 900 lb, and in 1925 appeared two aircraft which set the seal on his reputation as a designer —the Southampton Mk I and the S.4. The Southampton could climb and turn on one of its two Lion engines; as for the S.4, Mr. Smith again quoted *Flight* (September 24th, 1925): "One may describe the Supermarine-Napier S.4 as having been designed in an inspired moment . . . The greatest credit is due to R. J. Mitchell for his courage and striking out on entirely new lines . . ." Stressed-skin construction and trailing-edge flaps were used.

In 1926 the metal-hulled Southampton appeared, affording a structural weight-saving of 540 lb, apart from another 400 lb of water soakage. In 1926 also the Sparrow was converted to a parasol monoplane in order to investigate full-scale the merits of various wing sections.

Mitchell's experience in designing the S.4 came to full fruition in 1927 with the S.5. This was described by Mitchell himself in the only technical paper he wrote, and in which he listed the main problems as reduction of weight, reduction of drag and a satisfactory water performance. The structure weight was, in fact, only 36 per cent.

The year 1928 saw the building of the Jaguar-engined Nanok, later re-named Solent and used as an air yacht, and in the following year came the S.6, with a 1,900 h.p. Rolls-Royce engine, marking, as Mr. Smith said, "that close co-operation between Supermarine and Rolls-Royce which has lasted till the present day." On this machine F/O. Waghorn won the Schneider Trophy and S/L. Orlebar established a world speed record of 358 m.p.h. Contemporaries were the Seamew—resembling a miniature Southampton—and the monoplane Air Yacht, with three geared Jaguars. The year 1930 saw the building of the Southampton Mk X three-engined sesquiplane and the placing of a contract (subsequently cancelled) for a giant flying-boat with six Rolls-Royce H engines.

Thanks to Lady Houston and her presentation of £100,000 to the Government, Britain was able to participate in the 1931 Schneider Contest with the S.6B, which was victorious at 340 m.p.h. and later put up a speed record of 407 m.p.h.—the latter standing as a British record for fourteen years.

As a private venture, in 1932, Supermarine produced the Walrus pusher amphibian, and during the same year Mitchell began to think in terms of a high-speed aircraft based on the F.7/30 specification. The outcome was a monoplane of 46ft span powered by a steam-cooled Goshawk.

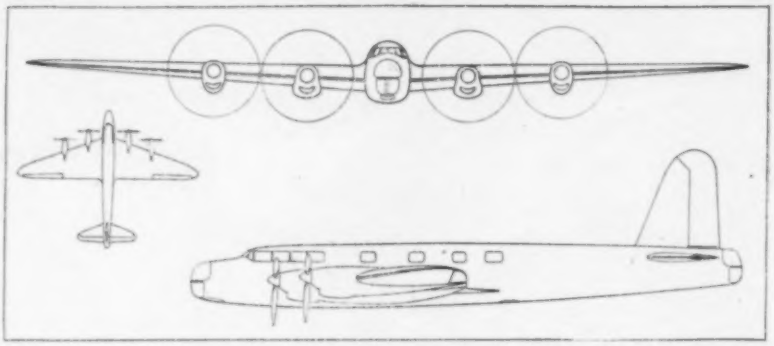
In 1933 came the Kestrel-engined Scapa flying-boat, capable of 142 m.p.h., and in 1934 the larger, Pegasus-engined Stranraer (165 m.p.h.). The Stranraer, said Mr. Smith, exceeded all the specification requirements by large margins, adding that it was also built in Canada, where, said the lecturer, it "remained in use until recently." [According to *The A.B.C. World Airways Guide*, Queen Charlotte Airlines are still operating at least one Stranraer—Ed.]

While the estimated performance of the F.7/30 was achieved, Mr. Smith went on, Mitchell felt that considerable improvement could be made, and he began work on a project which ultimately became the Spitfire. Early in 1935 Supermarine received a contract for a prototype Spitfire and later for a four-engined bomber to Spec. B.12/36. This bomber was the last aircraft Mitchell designed and it seemed to Mr. Smith that there was little doubt that it would have been highly successful. It was a 93ft-span mid-wing monoplane of swept-back plan form, to be powered by Merlins, Hercules or Daggers, and weighing 55,000 lb all-up. Maximum speed was estimated as 370 m.p.h. and the range, with 8,000 lb of bombs, as 3,000 miles. The wing had a single spar using hollow-tapered extrusions for the booms, and the main fuel supply was carried in leading-edge tanks which were part of the structure. Mr. Smith went on: "The use of the torsion box single spar principle allowed the carriage of bombs in the wing aft of the main spar in a single layer. The undercarriage and tailwheel had twin wheels. Power-operated gun turrets were fitted in the extreme fore and aft ends of the fuselage, with a retractable turret amidships. A variety of bomb loads was catered for, including twenty-nine 250 lb bombs and seven 2,000 lb bombs. A large proportion of the design work and approximately half the construction was completed when the fuselages were destroyed by enemy bombing and the work was then abandoned in favour of increased Spitfire production."

In the last full year of Mitchell's life—1936—his health was failing and occasioned absences from work. When possible he carried on with his work on the bomber, and on March 5th witnessed the first test flight of the prototype Spitfire K5054—by "Mutt" Summers at Eastleigh. It was soon established, said Mr. Smith, that Mitchell had produced the fastest and most efficient fighter in the world. In June 1936 the Air Ministry awarded a contract for a large number of Spitfires, and Mitchell was satisfied that he had done his part in providing the country with a means of defending its freedom. This thought sustained him until the end.

* * *

The lecturer's remarks on R. J.'s illness made poignant hearing: "And finally, in this attempt to show you Mitchell the man, I turn to his magnificent courage. In the whole range of human emotions there can be nothing as terrible as the realization that an incurable disease makes one's death inevitable within a short space of time . . . It happened to Mitchell, and I can personally vouch for the fact that he behaved in a way which was beyond praise. To talk to him during this period was to see the highest form of courage, and the memory



General arrangement of the Supermarine bomber to Specification B.12/36. This was the last aircraft designed by R. J. Mitchell and promised to be highly successful. The fuselages of the prototypes were destroyed by enemy bombing and work was abandoned.

IN MEMORY OF R. J. MITCHELL . . .

must always remain an inspiration. The facts are tragically simple. In 1933 R. J. was taken ill and underwent an operation which it afterwards became evident was only partially successful. Although he apparently completely recovered, he became increasingly subject to bouts of pain during the next three years, and in March 1937 a further operation was carried out. It was then found that the disease had progressed to the extent of being incurable, and he was given three months to live. He was told so by his surgeon, and he returned home. He proceeded to put his private affairs in order and made wise provision for his wife and son down to the smallest detail. In April he was flown to Vienna to the clinic of Professor Freund, but the disease had progressed too far, and he returned home at the end of May. Three weeks later he died at his home, having been unconscious for several days. He was only forty-two years of age, and his brain was in its prime. It was a tragic loss to his country, his firm and his friends."

Summing-up, the lecturer said that, in his opinion, Mitchell would have foreseen in good time all the design-problems of today, and would have thought out solutions to them; and with his skill and dogged determination it was possible that he would have greatly exceeded the present rate of progress.

Mr. Smith concluded: "I should be more than happy if I have succeeded in awakening the ambition of even a few of the younger members of my audience to try to emulate R. J. Mitchell. There is no doubt that, in order to carry on the great work which he started, more and more qualified technicians with his kind of drive and genius will be required, not only in the design field but also in those of mathematics, physics, engineering and electronics. I am quite certain that no better memorial to the memory of R. J. Mitchell could exist than the plentiful and continued flow of technically qualified men into the industry which he served so well."

* * *

After the delivery of the lecture the president of the R.Ae.S., Sir William Farren, added tributes of his own and also invited one or two of the many present who had known R. J. Mitchell as a personal friend to add their reminiscences. Air Marshal Sir John Boothman and Air Marshal Sir Ralph Sorley gave personal recollections and spoke respectively of Schneider associations and the decision to equip the Spitfire with eight guns. Major Bulman, recently returned from Hong Kong, proposed a vote of thanks to the lecturer.

After the meeting a memorial dinner was given at Southampton University by Vickers-Armstrongs, Ltd. There were toasts by the company's managing director, Mr. George Edwards (who took the chair), to the memory of R. J. Mitchell, and to the guests by Mr. A. N. Clifton, Supermarine assistant chief designer; the replies were by Air Vice-Marshal R. L. R. Atcherley and Sir John Buchanan. R. J. Mitchell's son, Dr. Gordon Mitchell, spoke in warm appreciation of Mr. Smith's generous tributes, adding the view that he—the lecturer—had been unduly modest over his own work as successor to "R. J."

A NEW FRENCH FIGHTER

Details of the SFECMAS 1402 Gerfaut Transonic Delta

ON February 6th and March 20th last year we published photographs of the Arsenal 1.301 delta-wing glider, which was used to provide experimental data on a series of high-speed wings and control systems. Air-launched from a Dakota or Languedoc, this glider employed wings of very low thickness/chord ratio and a variety of tail configurations.

It was an open secret that the work was intended to assist the design of a small, transonic fighter. This fighter has now been completed by the private firm SFECMAS—successors to Arsenal—and is a machine of absorbing interest. Styled SFECMAS 1402 Gerfaut, it is the first of several deltas now being developed by the French company. Unlike M. Jean Galtier's earlier Arsenal fighters, the 1402 is remarkably small and bears a faint resemblance to the McDonnell XF-85 Goblin parasite of 1947.

Cruising over the Etang de Berre, the SFECMAS 1402 is flying at high-angle of attack, with the tailplane at full negative incidence. Both anti-spin and braking parachutes are fitted in fairings in the lower fin. *Another picture is on page 120.*

The wing has a thickness/chord ratio of less than six per cent. The trailing edge is straight and the sweep on the leading edge nearly 60 deg. Unconventional constructional methods have been employed for this wing, and undoubtedly much of the structure is of high-tensile steel. Each trailing edge carries a flap and aileron, both of which are of minute dimensions owing to the small span. Lack of space within the wing has pushed the control linkage outside, on upper and lower surfaces. No leading-edge flaps or slats are fitted and, since the leading edge is very sharp, low-speed behaviour at high angles of attack cannot be exemplary. The wing houses no fuel or equipment.

The stubby fuselage contains a SNECMA Atar turbojet carried on the two centre-section spar bridge-pieces and fed from a straight-through duct. The present 1402 has an Atar 101C of 6,200 lb static thrust, but later aircraft are to have more powerful Atars and, possibly, other engines. Above the engine and duct is a superstructure housing a full-size cockpit and the tankage. The cockpit is equipped with an ejection seat and a "clamshell" canopy, and the windscreen is sharply raked, with a vee front.

The undercarriage, of Messier design and manufacture, employs high-pressure tyres and disc brakes. The nose unit retracts backwards, and the shape of the door shows that the wheel turns to lie flat in the fuselage. The main wheels are also housed in the fuselage, although the track is commendably large—about half the span.

Conventional powered ailerons are fitted, and it is believed that their profile is stabilized with a plastic lightweight filling. The large fin makes up for the short tail moment-arm in providing adequate damping, and the tiny delta tailplane is a one-piece all-moving surface. The tail is, in fact, similar to that of the Boulton Paul P.120. Air brakes are fitted on each side of the jet-pipe, and their leading edges are curved to fit snugly against the rear fuselage when open.

The present 1402 was first flown on January 15th at Istres, near Marseilles—roughly six months behind schedule. The pilot was M. Turcat who, incidentally, was given a brief course on deltas in an Avro 707C at Boscombe Down last autumn. The first 1402 is purely experimental, but later variants—which may exhibit some unusual features—are to be fighters, with full interceptor equipment and rocket armament.

SFECMAS 1402 Data: One SNECMA Atar 101C, of 6,200 lb thrust. Span, 21ft 4in; length, 32ft 6in; height, 13ft 8in; gross wing area, 205 sq ft; all-up weight, under 8,000 lb; initial climb, approximately 25,000 ft/min.

The second Britannia prototype, G-ALRX, at London Airport last Friday. It delivered the Editor and took Sir Miles Thomas (below) back to Filton.

BRITANNIA SAMPLED

Passenger Impressions of the Bristol Airliner on a Filton-London Flight

LAST Friday the Editor was offered an opportunity to make a brief passenger flight in the Bristol Britannia second prototype. In the following notes he gives his impressions of the experience.

I HAD looked forward to a flight in the Britannia for many months past; in fact, ever since I had seen it make its quiet, graceful, almost lazy passages over Farnborough. It then gave the impression of having an aptitude for flying and an ease of movement which made me want to join it in the air.

The machine is not yet furnished, and the exceptionally spacious fuselage—almost clear of bulkheads—contains recording equipment, ballast tanks and a few banks of triple seats dotted along its length. The soundproofing material is in position, but the final effect will not be felt until this is covered and the trimmings, carpet, curtains and the rest are in position.

The flight crew, together with observers, totalled eight, and the half-dozen passengers included Dr. Russell, the chief designer. The take-off weight was 130,000 lb. (Maximum a.u.w. is 140,000 lb.)

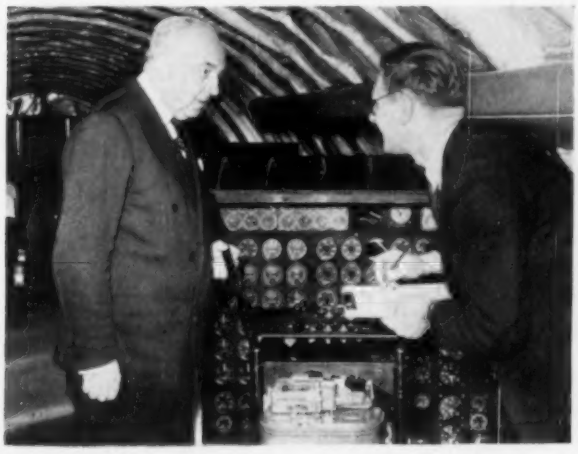
It is no line-shoot to say that I had to look out of the window to find out if the engines were being started and, if so, how many were running. Once the four Proteus were at flight idling they could just be heard. Seen from the cabin windows the nacelles appear enormous and one cannot look along the whole length of the wing, as on some machines. The outer section of the wings are, however, visible and the bevelled tips have a curious upswept look at the trailing edge when viewed from the cabin. In flight there is some visible flexing of the wing, as would be expected.

The free-floating ailerons move through quite big angles in spite of their large area. The entire aileron trailing edges are occupied by tabs which either move as if part of the ailerons when these are floating or separate and contrary to them when operated by the pilot's controls.

The double windows of the cabin are oval and quite large. They produce rather more distortion than usual around the edges.

After a thorough cockpit check Mr. Bill Pegg, in the captain's seat, taxied rapidly up the Filton runway, occasionally exercising the powerful brakes. I spent this time in the cockpit (in addition to the eight others). There was no sign of pitching while taxying, but one felt the runway as one would on a car with over-hard tyres.

Bristol's chief flight test observer, Mr. M. W. West, is questioned by the chief customer about one of the automatic observers installed in the Britannia's spacious fuselage. "Flight" photographs



Weather was very poor, and no sooner had the Britannia become airborne by the crest of the hump on the runway than Pegg was climbing it in cloud. The noise and vibration on take-off are not obtrusive and, in fact, mark a further step towards near-silence, just as the aircraft represents a large step forward by comparison with any piston type in service today. To one sitting in the cabin there is no indication that turbines are providing the power. The rumbling from the huge paddle-blade airscrews apparently produces almost all the noise that there is. Bearing in mind the high take-off weight, the machine unstuck and climbed very quickly.

Traffic control required us to level off at 7,500ft in cloud or a lane between cloud for the flight to London. The quietness at low cruising power is very satisfactory except up forward between the airscrews. Here there is still a fair amount of buzzing; in service, however, this may affect only the freight and toilet compartments. When fully pressurized at cruising height of 30,000ft noise is further reduced, I was assured. Aft of the wing, quietness reigns in the main cabin and normal conversation is possible between passengers several paces apart. Those seated here will undoubtedly enjoy an untiring ride and a good view.

Although they have no particular significance, some instrument readings may be of interest. While cruising at 7,500ft the compressor speeds of the Proteus were 10,000 r.p.m., the airscrew speeds 855 r.p.m., and the indicated flying speed was 210 kt. Cabin altitude was kept at 2,500ft, although it could, of course, have been retained at sea level—or even lower.

Normal cruising r.p.m. for correct operational altitude would have given excessive speed at under 10,000ft, hence the use of 10,000 compressor r.p.m. rather than 11,350. An arbitrary speed limitation of 275 kt I.A.S. is being observed during development flights. This is the V_{ne} speed. V_{df} is 305 kt.

A few miles short of Windsor, the Britannia, already letting down, ran out into watery sunshine and permission was given for a straight-in approach to London Airport. The enormous slotted flaps uncoiled themselves, but I could not detect the lowering or locking of the wheels. Quite near the runway the flaps extended even more, to show themselves in full barn-door splendour, and the Britannia was eased gently on to the ground. The flight had taken 27 minutes.

Almost at once a thrum of new power was transmitted in marked braking effect; reverse pitch is now used on all landings. Pegg taxied in rapidly on all four engines and soon the aircraft was parked in the B.O.A.C. servicing area. After a brief delay motorized stairs were manœuvred to the port-side amidships door, some care being needed to avoid the long pointed end of the inboard nacelle.

We shall now look forward to an operational flight in a fully furnished machine. There is no doubt that in its rôle of long-range tourist transport the Britannia will offer its hundred or so passengers first-class comforts at turbine speeds and heights. In all, nearly 300 hours of test flying has been completed on the prototypes and production for B.O.A.C. is well advanced with a view to introduction into service in the summer of next year. It is probable that Britannias will first see service on the African routes before being introduced on the London - New York run.

Sir Miles Thomas, for whom the Britannia had been sent to London, was waiting to greet us and then to take over with Mr. Cyril Uwins our seats in the aircraft for the return flight. This took only 24 minutes, and on arrival back at Filton, to demonstrate the braking power of the reversing airscrews, the pilot landed down a wind of 17 m.p.h. Prior to this flight Sir Miles had had air experience of the first prototype Britannia.

HERE AND THERE

FRANCE'S NEW FIGHTER, the prototype SFECMAS 1402, details of which, and an air photograph, appear on p. 118. The picture above was taken before the anti-spin parachute was fitted. Cockpit access is by steps on the port side. The name Gerfaut has been adopted.

Dutch Merger

SUBJECT to approval by shareholders, Fokker are to acquire the firm of Frits Diepen, who operate, at Ypenburg, a large aircraft-overhaul organization and two flying schools. During the German occupation they built a light pusher, the Difoga 421, "under cover."

Modern Light Flak

FROM Switzerland it is learned that a new Oerlikon 20mm anti-aircraft gun, designated 6JLa/5TG, will equip formations of the Swiss infantry and artillery, and partly equip the rest of the army. The muzzle velocity is quoted as 3,600ft/sec and rate of fire as 1,000 rounds a minute.

U.S. of S. at H.P.

THE Cricklewood works of Handley Page, Ltd., were visited on January 18th by Mr. George Ward, Under-Secretary of State for Air. Later, accompanied by Sir Frederick Handley Page, he drove out to Radlett, inspected the Victor, and saw the extensive research and other equipment now installed there. Bad visibility prevented a flight in the bomber.

In the Chair Again

WEST GERMAN radio reports that, as result of the easing of restrictions on aviation in the Federal Republic, the chair of aircraft construction at the Munich Technical College, which has been unoccupied since the end of the war, has now been filled again. Prof. Julius Krauss, a former director of the Messerschmitt works, who held the post from 1942 to 1945, has been reappointed to the post.

Preventing Wet Starts?

DERBYSHIRE County Cricket Club are to try drying wet wickets by means of a turbo-jet. Rolls-Royce, who have been asked to co-operate by lending an engine, think the idea might be effective but, in terms of fuel consumption, expensive.

A.T.A. Reunion

THE Air Transport Auxiliary Association is to hold its annual reunion dinner on February 12th, at the Eccleston Hotel, London, S.W.1. Details from Miss Sidone Bowell, 25 London Road, Luton, Beds.

A.S.T. Chief's Trip

THE managing director of Air Service Training, Ltd., Air Marshal Sir Hugh Walmsley, K.C.B., K.C.I.E., C.B.E., M.C., D.F.C., has returned from an 18,000-mile round trip to Pakistan and India, where, in 1946-47, he was Deputy Supreme Commander (Air) and A.O.C.-in-C. R.A.F. in India. His visit was to inspect the technical training schools in Karachi and Bangalore, and the pre-apprentice and pre-cadet "public schools" started by A.S.T. for the R.P.A.F. during the past year. With the Governor of West Punjab, Sir Hugh attended the official opening ceremony of the pre-cadet school at Sargodha and had talks with senior Government and Air Force officials in New Delhi and Karachi.

WHAT A BIND! Brought to a halt on the runway at Landstühl, near Kaiserslautern, this F-84G recently demonstrated the U.S.A.F.'s emergency arrester gear. On landing, the fighter's nosewheel engages a nylon rope, which lifts a steel cable on to the main undercarriage legs. The cable then drags 20 tons of iron chain from the sides of the runway, producing violent deceleration. If the small dog was by any chance used as an aiming-point it apparently survived.

Postal Command

TWO Shackletons of Coastal Command flew from R.A.F. station Ballykelly, Northern Ireland, on January 20th in order to drop 1,200 plastic envelopes into the Atlantic. The flight was the first of a series, sponsored by the National Institute of Oceanography, in connection with the mapping of the flow of currents that carry ships' waste oil to our shores. Finders of the envelopes will receive a half-crown reward on returning them.

Kingston to California

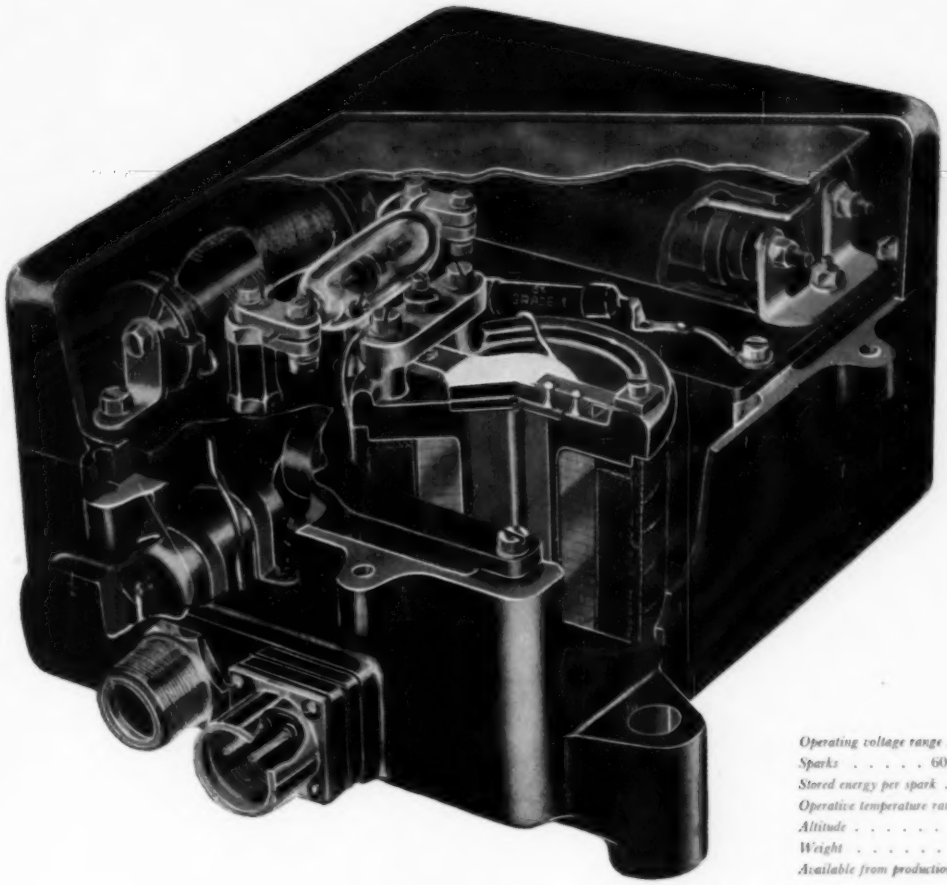
SELECTED by the Royal Society for the award of one of the first research fellowships set up by the American Government to enable young European scientists to study in the United States is Dr. G. N. Newby, B.Sc., Ph.D. He was, until recently, in the Hawker aerodynamics section under Sir Sydney Camm, and he hopes to return there after his two-year course at California University.

Approved

THE Hindustan Aircraft Factory at Bangalore, makers of the HT-2 trainer, has received the "Air Agency Repair Station Certificate" of the United States Civil Aeronautics Administration. The certificate—stated to be the first awarded to any aeronautical concern in Asia—was formally presented by Mr. Albright, C.A.A. regional representative. Incidentally, it is now learned that when the company's chief test pilot, Capt. Namjoshi, lost his life in a recent crash he was not testing an HT-2 but was practising low-level aerobatics in company with a Vampire.

Claim of the Flying-Boat

DELIVERING the recent Watt Anniversary Lecture at Greenock, Sir Harry Garner, formerly Chief Scientist, Ministry of Supply, said that flying-boats were being "unjustly neglected." With turbo-jet engines, he said, they could be as efficient, and even more efficient, than landplanes of the same size and to the same specification. The Princess had flown successfully, but the results of recent research would enable even better results to be obtained in the future. "For a maritime country such as ours, it would be a national disaster if the flying-boat were not further developed," he added.



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R.A.F.

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SUPERMARINE WORKS

TWO-OCEAN PASSENGER

Sydney to London via *Pacific and Atlantic*

By FRANK BESWICK, M.P.

IT is sometimes said that the better route from Sydney to London is *via* the Pacific. I was able recently to try it for myself.

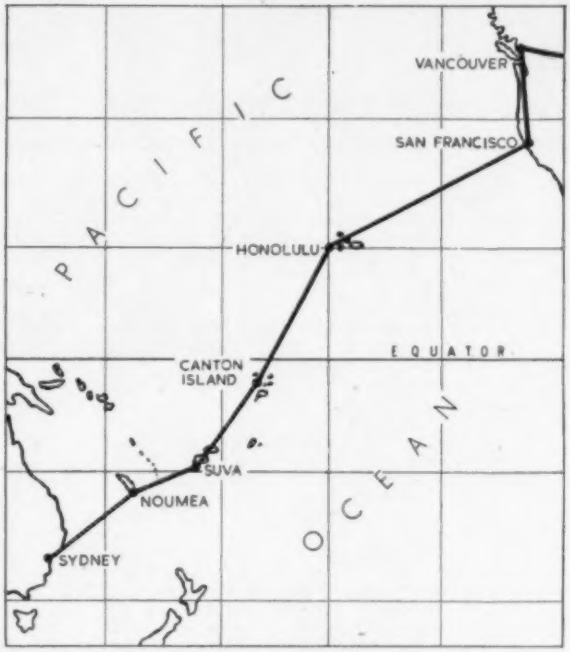
Out of Sydney the usual service would have been by a British Commonwealth Pacific Airlines' DC-6, but I was tempted to travel again by flying-boat as far as Fiji. When I mentioned this intention, Sir Hudson Fysh was inclined to be diffident: he said Qantas were compelled to use oldish machines on this comparatively minor route, and I mustn't assess his company's standards by them.

In the event, I thought he was being unnecessarily modest. It was a most enjoyable trip. We started from Rose Bay, Sydney (surely one of the most convenient and the most beautiful air terminals in the world), in unpropitious circumstances. A severe storm blacked out the southern stars; and for three hours, until we alighted at Brisbane for refuelling, the Sandringham was buffeted about like a barrage balloon. The advantages of flying above the weather do not, therefore, need to be laboured; but even obsolescent flying-boats have a special virtue from the passenger viewpoint. The flying-boat is a friendly aircraft. This factor should be given full weight with all technical data when considering, for example, future operations of the Princess.

By the time we reached Noumea for breakfast—seven hours from Brisbane—the little party in our compartment of the boat certainly needed no glossy magazines for distraction. One particular offset to the lack of pressurization was the U.S. army sergeant who explained his system for securing 90-day leaves. It was a fascinating theory of army life; but probably the most subtle touch of all was that when he reported back to his Pacific-island base he had earned 15 more days' leave over the 90-day period!

Going ashore for breakfast at Noumea was a much smoother business in that coral-encircled harbour than it had been off the coast of Queensland. But completed forms had to be handed in. As often before, I found myself praying for the success of I.C.A.O. and any other efforts to end these futile exercises in paper-work. And if they cannot be ended then let us have forms which make sense in an air age. What is the "last point of departure"? Is it the last place at which we refuelled or the port from which we originally set out? And if the latter, when so many go so far for so short a time—or even continue round the world—cannot the port of departure be put down correctly, as also the destination? Even the date is a matter of conjecture when one flies so easily over the international date-line. As for the inevitable, "where did you spend the previous night?" I saw one passenger with a home-made time-and-distance scale trying to establish the approximate latitude and longitude within which he had spent the last hours of darkness. On this occasion I recall suggesting to the U.S. sergeant that against "purpose of visit" he should put "Ninety days' leave."

Awaiting the launch after breakfast at Noumea, New Caledonia: the Sandringham flying-boat "Pacific Chieftain" is moored in the background.



IN "Flight" of October 30th last, Mr. Beswick discussed the economic and political background to airline operations over the Pacific route from Australia to the western seaboard of America. In the present contribution he describes incidents and impressions of a journey eastward across the Pacific by Qantas and B.C.P.A., adding a note on the final stages—by T.C.A. and B.O.A.C.—which brought him home to England. Another of his articles, on Butler Air Transport's internal routes in Australia, appeared in our issue of November 27th last. During 1950-51, in the former Government, Mr. Beswick was Parliamentary Secretary to the Ministry of Civil Aviation; during the war he served in Transport Command.

From Noumea to Fiji was about a five hours' flight. One further advantage of the flying-boat service for those visiting Fiji is that the marine base—from which the R.N.Z.A.F. also operate Sunderlands—is close by Suva, the capital city. Nadi, the international airport, is on the farther side of the island Viti Levu, which, incidentally, is the largest island of the large Fijian group.

From Nadi to Suva by road means a five or six hours' drive. To motor along most of the round-the-island road involves a dust storm when it's dry and a mud bath when it's not. Fiji Airways offer alternative transport by Rapide in under 1½ hours.

Fiji Airways have a three-year contract with the colony's administration to operate certain air services. The terms provide for a £7,000 subsidy each year whilst operating two Rapides, or with three machines, which they now have, a subsidy of £6,000 a year. They also carry the air mail for the colony.

The contract was granted after some controversy, I understand, about the possibilities of air transport in the area. Mr. Harold Gatty (of whom I only heard but did not see, and who I remembered as the one-time partner of the late Wiley Post) is the motivating force of Fiji Airways. One thing, at any rate, impressed me about the company; it must have as low a percentage of central overheads as any air-line anywhere.

There are now five landing places on these 320-odd islands in the Fiji group, ranging from the great airport at Nadi to an austere strip just opened on one of the smaller islands. International Aeradio have now contracted to supply radio and telecommunication facilities in the area.

Without doubt, air transport has much to offer, here as elsewhere, though the requirements expected from the aircraft are most exacting. Range and safety over the considerable ocean stretches and the ability to use small airstrips are fundamental essentials—together, of course, with extreme economy for the limited traffic offering. The ocean area would seem a natural for flying-boats, though as a near-immediate replacement for the Rapides the local talk was of the twin-engined Pioneer project contemplated by those who plan at Prestwick.

Fiji and the neighbouring groups are brought nearer the mainstream of Commonwealth life by Nadi (incidentally, the occasional spelling Nandi comes from the pronunciation). Even assuming a war-time legacy for the capital cost, the maintenance liabilities would be beyond the resources of the colony and are now shared by members of the South Pacific Air Transport Council, with New

TWO-OCEAN PASSENGER . . .

Zealand (somewhat dubiously just now, I suspect) taking a large share.

Though the present concessionaires of the Mocambo restaurant and rest-house have endeavoured to disguise the military character of the interior of the buildings with a little autochthonous decoration of dried leaves and canes, the atmosphere is of that peculiar character which only air travel can provide—not so much international as supranational, or more correctly, non-national.

One evening I speculated, as we are all apt to do, on the load of passengers who came in for dinner. One happy young New Zealander was bound for, of all places, Wigan. Another gentleman at this cane-covered bar in the South Pacific volunteered the information that he was from Geneva and was going to London; but his route deviated more than even Chesterton's rolling hero could have dreamed, for he was flying from one part of Europe to another *via* Auckland and San Francisco.

At Auckland, he told me, he had attended a dinner to celebrate the success of the air-transport section of the New Zealand air race. He complained, quite strongly, that at the dinner Mr. Jack Profumo and Mr. Peter Masefield had spoken a lot of patriotic and commendatory words about British aircraft in general and the Viscount in particular; this, he felt, was scarcely fair in view of the fact that the Dutch were, after all, the winners of the race. Bearing in mind the great struggle for survival of the small Dutch nation I intimated that from what he said there might have been more tact. "But," I added with more firmness, "had it have been the Americans there, we should have been well justified in rubbing it in." Not until afterwards did I learn that the gentleman from Switzerland in the Fijian rest-house was a United States citizen representing American aviation in Europe . . .

We left Nadi at 4 a.m. by the B.C.P.A. Vancouver service. A big sales point of this operation has always been the sleepers for everyone at no extra cost. It is a justified point. On this occasion, with only eleven passengers in the DC-6, there was not even need to convert the bunks back to seats and throughout the day and night the passengers had the option of lounging in a seat or lying in bed. Most chose the latter.

What with extended sleeping hours, changing times, nothing but sea and clouds outside, and two Wednesdays in the one week through crossing the date-line, the normal rhythm of life was difficult to keep.

I imagine that something similar must apply to the personnel on Canton Island, our next stop. The island is now an Anglo-American condominium and the only spot in the world, within my knowledge, where British and American currency are equally acceptable. Not that there was any need, or possibility, of passengers spending either. There was coral, there was sun, there was a runway; there was, I understood, excellent fishing; and that was about all.

The Union Jack flew there, and Pan-American had provided a most elaborate world signpost as a reminder that there *are* other places on the globe. Most of the white servicing personnel appeared to be American. Aviation owes much to men and women who serve at stations like Canton Island. One notice on the board, signed by the social-club secretary, stated sadly that the beer shortage persisted and that fresh supplies could not be expected for some weeks; members were warned that this beer famine was seriously affecting the wine and spirits situation and that moderation was called for. It seemed to me that the state of affairs thus disclosed was something of a reflection upon that air transport which these people served.

From the aridity of Canton Island to the lushness of Honolulu is a little more than nineteen hundred miles. All the Pacific airlines advertise an extended stop at Honolulu. As we were late and landed at nightfall (a not uncommon experience, I fancy, on this long haul), the delights of Waikiki were denied us. However, having twice previously visited Honolulu, I confess to the view that apart from the beaches the attractions are over-rated.

Moreover, one must first persuade the authorities that one is a desirable even if transitory alien. I must report that we saw more officials at this port of entry to the U.S.A. than at those of any of the much-criticized nations struggling towards stability in South-East Asia. And, as one of my fellow passengers remarked in forthright Scottish accents, among the seven officials we saw going in and coming out, not a "please" or a "thank you" was uttered between them. But what really surprised me about these arrangements came later. Having cleared thoroughly and properly at Honolulu, and passed safely through San Francisco, I was told at *Montreal* that, in common with all other human beings who had set a temporary foot in U.S. territory, I must render *Form I-424, Departure of Aliens*, for the benefit of the U.S. authorities.

Offsetting these air-age aggravations at Honolulu there is fried Maryland chicken in the Sky-room (or Sky-line, whichever it is), to the accompaniment of seductive lighting, some music, and incessant paging of this passenger and that.

From Honolulu to San Francisco there is another great ocean haul of 2,400 miles—the vital sector as far as the economics of the operating aircraft are concerned. At San Francisco we picked up another batch of passengers for the 800-odd miles short hop over exciting scenery to B.C.P.A.'s terminal at Vancouver.

That completed, so far as B.C.P.A. and myself were concerned, a good, hard, clean, straightforward run of nearly 10,000 miles. As an operational exercise, with modern aircraft, the Pacific route is an attractive one; it is obviously now a keenly competitive one. The competitors are the British Commonwealth *v.* the United States, and at the moment my impression is that the latter are winning. For operational efficiency and friendly, informal service in the air I give B.C.P.A. full marks. On the ground their publicity is not comparable. Handling and servicing are often contracted to others and, though doubtless yielding economies, this has the effect of pushing the Commonwealth company's name in to the background.

As example of the unrelenting publicity which they have to face I give my experience at Suva. At the Post Office, having mail to dispatch, I asked for air-mail stickers. I was given them readily —bearing the inscription "By Air Mail *via* Pan American Airways." One's admiration for American enterprise is equalled only by that for the toleration of Her Majesty's postal officers in the Crown Colony of Fiji.

The future of B.C.P.A. is still in the balance, with the scales now held, I understand, by New Zealand's Prime Minister. As I have written earlier, the problem is complicated and there are many considerations to take into account; but I believe that an early decision would be in the best Commonwealth interest. Under one direction or another a renewed Commonwealth sales drive in the area would seem to be essential.

From Vancouver I was transported onwards by Trans-Canada Air Lines. I am told that T.C.A. passengers are contented people, in which case I am the exception. It was certainly a well-patronized service but by the time I could stretch out my legs at Montreal I was thinking that there was something in the arguments against a route monopoly, for the service and comfort aboard, by any non-tourist standard, were, shall we say, robust.

At Montreal there was B.O.A.C. once more. My considered (and, I hope, objective) view is that the B.O.A.C. North Atlantic service is the best currently provided by any airline anywhere. I will not risk his irritation by naming the particular captain, but when he walked through the aircraft to ask the conventional questions I must say that he commanded respect and generated confidence. One sensed that there could be nothing second-rate about that service. Such an atmosphere is not cheaply nor easily generated. It cannot be achieved save with good-quality staff working under good-quality conditions. It would certainly be interesting to see this service extended westward round the globe.

World signpost by PanAm at Canton Island.

The author takes a stroll during the refuelling stop at Canton Island.

ERIC, THE VERY GENTLE KNIGHT

NOW this very gentle Knight, Eric, prepared to defend his realms against the barbarian invaders.

"What is the strength of my forces?" he asked.

"Four thousand and fifty gallant men and true," said his Chief Statistician.

"Arm them mightily to withstand every blow that the enemy may deliver . . ."

"But, sire, in all the land we have only two dozen skilled armourers. All our forges and furnaces are already at work . . ."

"Then do your best. Fashion the helmets of solid brass, make the suits of armour so strong that neither lance nor arrow will wound. Arm their steeds too with the finest and heaviest chain mail. I am a man of peace."

"But, sire, the task is far beyond our resources."

"Those who defend my realms," said the Knight Eric, "must be the most heavily accoutred in all Europe."

The Chief Statistician sighed, slowly shook his head and withdrew.

A month later the barbarians attacked and seventy-three knights rode forth to do battle, their fine armour gleaming in the sun, their plumes flying.

Eric, watching from the battlements of his castle, saw them, counted them and turned incredulously to the Chief Statistician.

"How many knights have we?" he asked.

"Seventy-three armed as you have directed, sire, and three thousand nine hundred and seventy-seven without weapons and therefore *hors de combat*."

Eric turned pale. He saw his seventy-three knights surrounded by thousands of barbarians. He saw them fall from their mounts and lie gasping like landed fish.

"Why, oh why," groaned Eric, "do they not get to their feet and fight like men?"

"Alas, sire," said the Chief Statistician, "their armour is too much for them."

As one by one the knights were slain Eric buried his face in his hands and wept.

"To think," he said, "that we might have put four thousand men and horses into the field!"

"Four thousand and fifty, sire," said the Chief Statistician.

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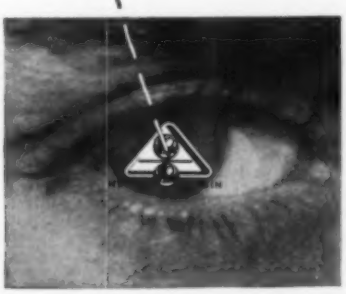
Although the range of Wiggin high-nickel alloys is already extensive, there is continuous development of improved alloys to meet the needs of designers.



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PRIVATE EYE JOINS UP

Decca 424 Airfield Radar: R.A.F. Trials and Ministry of Supply Orders

ENTITLED *Private Eye*, an account of a demonstration of the Decca Type 424 airfield radar appeared in *Flight* of September 11th, 1953. The equipment is basically a low-cost approach and talk-down control radar which, on that occasion, showed itself to be both simple and efficient. Decca Radar Ltd., are now able to quote an R.A.F. report made after two weeks of operation at a Service airfield in the preceding June. In the conclusion of the report it was stated "that the equipment is extremely flexible and capable of being operated in a variety of ways. The whole of the above trials were conducted with jet aircraft, and it is considered that [Decca 424] is the most suitable for this type of operation. The equipment was capable on all occasions of bringing aircraft down to 200ft and 800yd [from touch-down]; with the assistance of approach lighting the task became easier still. Rapid landing of jet aircraft . . . is comparatively straightforward, giving a satisfactory rate of landing." The following are some of the factors which led to this opinion.

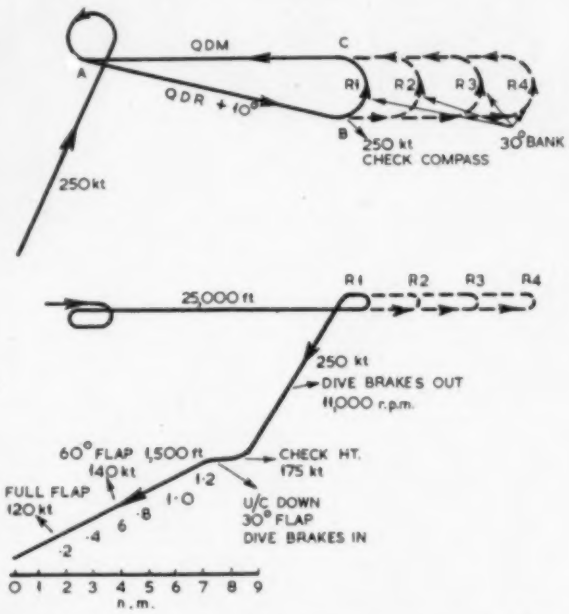
The equipment, mounted on the same three-ton chassis that was on show at Farnborough last September, was set up on the R.A.F. airfield on a site not altogether suited to it; the aerial was below the runway level and permanent echoes abounded. It was so sited in order to allow direct comparison with previous equipment used on the same site, and in order to assess the effectiveness of the differential and swept gain controls in breaking up the P.E.s. The equipment is simple to set up. It can be levelled by a spirit level permanently attached to one of the supporting arms of the scanner, and controls on the P.P.I. tubes allow the runway in use to be "zero-ed" on the centre of the tube. With the aerial fully depressed, the trace of the runway is centred and aligned with the appropriate magnetic bearing marked on the periphery of the P.P.I. Centre-line and range markings are made on the tube face with chinagraph pencil and the equipment is ready for use. On this occasion, communication consisted of tele-talk with the control tower and two four-channel V.H.F. transmitters and receivers.

All the trials were made with Meteor aircraft. It was found that, at the ideal aerial setting of +4 deg, a Meteor could be picked up with certainty at 14 radar miles (28,000yd). The Decca differentiation device proved to be capable of maintaining contact with the aircraft even through strong P.E.s and cumulo-nimbus clouds. Making use of the two independently controlled P.P.I.s and the cathode-ray direction-finding slave-repeater provided in the control cabin, an approach controller and a talk-down controller were able to handle aircraft landing in a stream at the very high rate of one every 20 seconds. The accompanying diagrams show the pattern which was employed to achieve these results. The required timing intervals were incorporated on the turn from outbound to in-bound legs.

From the standard high-level let-down from 20,000ft, aircraft were picked up at 3,000 to 4,000ft at nine to ten miles and taken over at the check height of 2,000ft. It was found that the C.R.D.F. slave-repeater was an essential part of the equipment when identifying up to six sections of aircraft with only 20 seconds' separation. From the take-over point, aircraft were brought in to the five-mile point by the approach controller and then handed over to "talk-down." They changed to "talk-down" channel (V.H.F.) and "acknowledged no further signals." Final approach consisted of heading instructions and range information; the pilots let down to pre-determined heights for the various ranges up to the final "look ahead and land." This was given when it was known that the pilot had either the approach lighting or the end of the runway in sight. The diagrams show the sequence of height and speed reductions and undercarriage and flap settings; these are, of course, those for the Meteor.

The straightforward stream-landing with 20-second intervals is a creditable achievement for any G.C.A. It was, however, also found possible to feed overshooting aircraft back into the stream. As soon as a pilot overshot he was turned Rate 1 left or right on to a reciprocal heading. A second Rate 1 turn suitably timed brought him back into the landing stream with the correct spacing. More significant still, the Decca 424 is so designed that it proved possible to switch an approaching aircraft on to another runway with no adjustment to the set. Once adjusted, the 424 will serve all runways on the airfield. Therefore, if the runway in use is for some reason suddenly obstructed, following aircraft can immediately be switched to a secondary runway irrespective of any change in bearing involved.

Because of the high rate of descent and climb of jet aircraft, the operators could not guarantee to avoid collision between aircraft in these conditions of flight. They did, however, guarantee collision protection between aircraft flying level. The Decca 424 scans through 360 deg. (at 20 r.p.m.) even on the final-approach P.P.I.



The let-down and landing pattern in plan (above) and elevation (below) used in the Service trials of the Decca 424 airfield radar. R.1, 2, 3 and 4 are the sections, each of two aircraft. Point A is overhead at base; sections fly the outbound leg AB, and then make a standard rate turn to point C at timed intervals, maintaining height. The let-down begins at point C and the sections arrive at the check-height at 1,500ft to be taken over by G.C.A. approach control.

Thus, in the critical and least manœuvrable condition of a jet aircraft, during final approach, the Decca G.C.A. operator can guarantee to avoid collisions with stray aircraft entering the pattern.

The R.A.F. trials team found the Decca 424 efficient and comfortable to use. They also recommended that, of the three forms in which the Decca 424 is available—mobile, static, or transportable—the last-named would be the most suitable for the R.A.F. This arrangement consists of the scanner mounted on a portable frame in the landing area, and the consoles and receivers (in transportable packages) set up as required in mobile vehicles or prefabricated huts. In this form, the equipment can be conveniently carried by either air or surface transport.

Following the trials described above, Decca Radar Ltd., announce that the Ministry of Supply has placed a contract for a number of Decca 424s to be used in extensive trials under operational conditions. The equipment is to be supplied in the transportable version.

B.T.H. AND THE COMET

IN a booklet describing the work of the British Thomson-Houston company during 1953 some new details are given of the equipment fitted in the latest aircraft. The Comet 2 is, like the Series 1, fitted with a B.T.H. electrical system, which embodies additional features and improvements as a result of extensive experience with the Comet 1 under all operating conditions. Already, prototype equipment for the Comet 3 is on test at the B.T.H. Coventry works. In this version of the Comet the demand for electrical power is increased by no less than 40 per cent, necessitating the use of a completely new alternator and control system.

Triple-shot turbo-starters (B.T.H. type TBS 720) are fitted to the Swift and Hunter fighters and are in large-scale production at a new factory at West Chirton. The single-cartridge version of this starter, together with a number of electrical machines and their control gear, are standard on the Canberra.

THE AVON-SABRE

Latest Particulars from Australia: Fuselage Sixty per cent New

A lively and informative air-to-air view of the prototype Avon-Sabre, first flown by Flt. Bill Scott, R.A.A.F.

SINCE the review "Sabres and Furies" in the issue of January 15th new information has come from Australia concerning the version of the Sabre produced by the Commonwealth Aircraft Corporation Pty., Ltd. An official description says that externally the machine is very little different from the F-86F, though substitution of the Rolls-Royce Avon RA.7 for the General Electric J47, and replacement of the six 0.5in guns by "cannon of heavier calibre" [30 mm—Ed.], required so many changes that only about 40 per cent of the original fuselage structure has been retained.

As the Avon consumes some 25 per cent more air than the General Electric, it was necessary to increase the size of the intake duct correspondingly. At the outset this appeared to present serious difficulties, but a simple solution was achieved in that the front fuselage was split horizontally and a "wedge" of structure inserted, thus dropping the lower line of the fuselage some 3½in at the front. In order to utilize as much of the original structure as possible the fuselage frames in the region of the nose had in most cases extension pieces let into their sides, and completely new frames were necessary only where dictated by the change in armament. The split in the duct was covered by a wedge-shaped strip of skin and the gap in the outer surface was covered by extensions of the skin panels. This comparatively simple modification left undisturbed the complex cockpit arrangements and the nosewheel-fittings in the lower half of the fuselage. A secondary benefit was derived in that take-off performance was improved, since the new arrangement lowered the nosewheel pivot with respect to the wing datum, thus increasing the static angle of attack.

Although the Avon has much the same dimensions as the J47, the mounting points are very different and the weight, according to the Australian description, "much reduced." Consequently, the engine had to be moved aft in order to preserve the original c.g. position, and, so that it could be completely supported within the forward part of the fuselage, it was necessary to move the transport joint rearwards to the new location of the engine-mounting trunnions. Thus, the rear part of the fuselage was shortened by some 26in and the forward part lengthened by a corresponding amount in order to preserve the original fuselage length.

The Avon brought with it many problems of cooling and venting, as well as the mere physical problems of access and installation; thus, from the rear spar aft to the transport joint an entirely new structure—though within the original mould lines—was required. Moreover, a gearbox separate from the engine was necessary, as provision had to be made for either electric or liquid combustion starting—thus utilizing all the space within the engine nose fairing which had been occupied, in the case of the J47, by the hydraulic pumps and generator. "In the train of this change," runs the Australian description, "followed changes in the shapes of the fuselage fuel tanks (and consequently in the fuel gauging system) and the repositioning of numerous services. Cooling and venting of the Avon engine for all flight and ground conditions was a major problem, as it was desired, in the interests of retaining maximum strength in the fuselage material, to limit all structural temperatures to a maximum of 200 deg F. In the zone forward of the firewall there is no great source of heat as this portion of the engine is comparatively cool. However, it is necessary to ventilate the zone to remove all fuel and oil fumes that might accumulate to form an explosive or combustible mixture. Thus, all drain lines from fuel pumps and filters have been carefully led overboard and the zone has been ventilated in flight by small N.A.C.A.-type flush entries in the outer skin, exhausting through an opening on the top centre-line. To cover the case of ground static conditions where no rammed air is available through the side entries a cooling flow is induced by means of the ejector pump action of the balance piston vents exhausting through the exit opening on the top centre-line. Aft of the firewall there are great sources of heat in the combustion chambers, turbine shrouds, exhaust cone and tail-pipe, and all important structural members such as longerons and major frames have been fabricated of corrosion-resistant steel. Skins and minor frames are fabricated of 75S aluminium alloy, while all control cables and hydraulic services have been isolated in stainless steel tunnels carefully ventilated with cool air. This zone is cooled by a flow of air between the engine-tailpipe combination and the fuselage structure, such air flow entering through three flush entries in the outer skin and exhausting through an annulus around the jet-pipe nozzle. In flight, the ram pressure recovery of the entries provides a sufficient cooling flow, but a light air-pump has had to be designed to provide sufficient cooling air flow in the case of engine running at full thrust on the ground and during take-off. The air pump is simple in principle, consisting of a line bleeding air from a high pressure stage of the axial-flow compressor and delivering this air to a tube bent into a circle and positioned in the cooling air exhaust annulus, co-axial with the jet-pipe. A series of ¼in diameter holes in this tube project streams of high pressure air rearwards, thus entraining sufficient air from the annulus to produce the necessary cooling air flow within the fuselage. This pumping action is necessary whenever the aircraft is stationary with engine running or at very low speeds. Thus, it has been arranged that the bleed line is open only when the undercarriage is extended and consequently no valuable compressor air is wasted, when maximum thrust is needed in flight.

As there were so many unknowns in the design of the cooling system, a dummy fuselage incorporating all cooling provisions was constructed and shipped to England and, with the co-operation of Rolls-Royce, was tested in a static rig with an Avon engine under all conditions of engine thrust. Structure temperatures were measured and adjustments were made until completely satisfactory cooling arrangements were achieved."

The Avon, it is pointed out, differs from the J47 in not being able to support the tailpipe in cantilever fashion. Thus, the shortened rear fuselage had to be redesigned to support the jetpipe in such a manner that neither tailpipe inertia loads nor empennage flight loads were transferred to the engine; additionally the jet-pipe supports had to provide for easy removal of the rear fuselage for inspection of the engine and tailpipe.

For security reasons the Australian description says little about the armament changes, except that great attention has been paid to servicing problems and "an exceedingly low turn-round time, covering flight servicing and re-arming, has been aimed at."

AERODROME OWNERS' A.G.M.

THE reverses suffered at a number of non-State-owned airfields as a result of the closure of the Reserve schools are among the subjects likely to be discussed at the forthcoming annual general meeting of the Aerodrome Owners' Association.

The meeting is to be held at the A.O.A.'s headquarters at Londonderry House on February 25th, and in the evening the annual dinner will be held at the Hyde Park Hotel.

Both the retiring chairman (Ald. R. Mould-Graham, O.B.E., T.D.) and the chairman-elect (Mr. Charles M. Newton) have recently had honours bestowed on them: the former a Deputy-Lieutenancy of the County of Northumberland and the latter an M.B.E. in the New Year Honours List.

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..."Anti-submarine weapons, both shipborne and airborne, far more effective than anything known during the last war, are becoming available, and arrangements have been made to enable heavier and faster types of naval aircraft to be handled in, and operated from, our fleet carriers."

Extract from the Statement by the First Lord of the Admiralty explanatory of the NAVY ESTIMATES, 1953/54.

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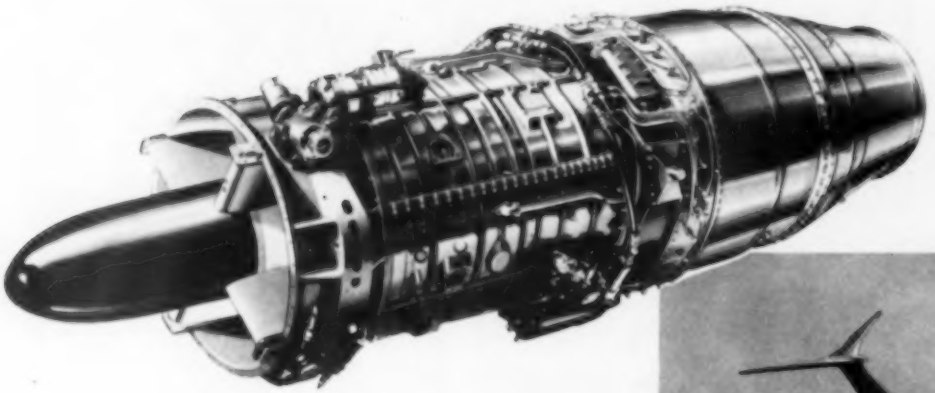

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Ocean Patrol

With the Shackletons of No. 42 Squadron, Coastal Command

Bulky, but businesslike and elegant, a Shackleton 2, with bomb door open, stands in its dispersal. This view clearly shows the characteristic nose with the bomb-aimer's panel beneath the nose gunner's position.

COMPARATIVELY little has been heard, in detail, of the work of Avro Shackletons in service. The prototypes M.R. 1 and 2 roared impressively past the crowds at Farnborough Shows, displaying yawning bomb-bays, and as often as not with three of their four Griffons feathered. And now the Shackleton has been in squadron service for several years. Training flights lasting a prodigious number of hours are regularly undertaken; from their bases on the Atlantic they have roamed far and wide over the ocean in all kinds of weather, by day and by night. Early last year No. 42 Squadron flew to Colombo and South Africa and, during last year's Exercise Mariner, Shackleton units were stationed in Portugal and in the United States. This month *Flight* paid a visit to No. 42 Squadron, Coastal Command, to study the type under service conditions.

No. 42 Torpedo Bomber Squadron, as it was originally called, was re-formed in June 1952 under the command of S/L. D. H. Sutton. Since that date it has been operating Shackletons on the Atlantic seaboard of the British Isles. No. 42 was originally formed at Filton on April 1st, 1916. It went overseas in August of that year under the command of Major J. L. Kinnear, and operated B.E.2D and B.E.2C aircraft on Army co-operation work in France, Belgium and Italy until 1919. The squadron was disbanded at Netheravon in that year, and re-formed at Donibristle in September 1936. The outbreak of World War II found the squadron flying Vildebeests at Bircham Newton, carrying out convoy escort along the East Coast. It was subsequently re-equipped with Beauforts and was in actions against *Scharnhorst* and *Lutzow*, and against *Scharnhorst* and *Gneisenau* during their escape up-Channel in 1942. At the end of 1942 the squadron moved to Colombo and was re-equipped with Bristol Bisleys. Eight months later it was again re-equipped, this time with Hurricanes, which were used to attack Japanese communications in Burma. No. 42 gave close support to the 4th Corps during the famous siege of Imphal and continued in the ground-attack rôle until it was disbanded at the end of 1945.

On June 28th, 1952, No. 42 was finally re-formed and equipped with the Shackletons they now operate.

The Mk 2 is basically similar to the Mk 1 and for operational purposes is considered interchangeable with it. Externally obvious changes include a lengthened nose and tail and re-positioning of the radar scanner; internal re-arrangement consists mainly of general improvements in ancillary equipment. Differences between the two marks in performance and handling are negligible.

It was arranged that the writer should travel as passenger in a Shackleton 2 which, at the time of the visit, was due to carry out a comprehensive exercise. The flight was to last 15 hours, and to include almost every type of operation of which the aircraft is capable. While the lengthy preparations for take-off were being made—inspections, bombing-up, loading of equipment—the captain, F/L. R. C. B. Ashworth, showed me the aircraft. We walked under the nose and into the open bomb-bay, the doors of which reached almost to the ground; with spotless white walls, it suggested a hospital operating theatre, and vari-coloured weapons of all sizes hung from carriers in the "ceiling." Although this ceiling is fairly close to the ground, access for personnel and trolleys is unobstructed.

For an aircraft designed for such a variety of offensive rôles, there are very few excrescences—some clusters of stick aerials, a mid-upper turret, and the almost completely retracted radome. Both mainwheels and twin tailwheels are completely faired when retracted; the nose gun position is cleanly blended into the contours, and the numerous openings are mostly covered by moving panels.

The main crew-positions are grouped round the wing centre-section—an area which is noisy but comparatively free from vibration. The seats are large, and many of them swivel; the back-rests are adjustable for height, and all are fitted with deep, soft cushions. One noted that long safety-harness straps were fitted on both wing spars where they passed through the fuselage, allowing the crew to strap in at ditching stations. The nose gunner's position in the Mk 2 is provided with a large swivel seat, which may possibly be modified when the two 20 mm. cannon are fitted—a programme that is now in hand. Although at first there appeared to be little space for movement, experience during the flight showed that it was possible for as many as five people to watch the navigator's table at the same time. The navigator's position is, in fact, spacious and well-ordered.

Hot meals can be prepared on an electric galley in flight, and two large bunks allow comfortable sleep for those off duty. The nose and after-fuselage sections, too, are spacious and have full head-room, making it possible for resting crew-members to stretch their legs and relax away from their working positions.

From the pilots' point of view the Shackleton is admirable. Only flying instruments and controls and basic engine instruments (revs and boost) confront them. The engineer supervises fuel gauges and flows, engine starting, and the other processes which lie in his sphere of activity. The Griffons are virtually independent, being almost entirely automatically regulated. They roar obediently for hour after hour, seeming to require no attention at all. The flying controls are responsive and positive, and the trimmers ready to hand and sensitive. Everything is reduced to a logical and orderly simplicity.

The only real points for criticism are noise and vibration. Despite some soundproofing round the crew's main working positions, noise level is high. The pilots sit in line with the contra-props of the inner engines, and the peculiar airscrew noise is clearly audible to them. Though not soundproofed, the nose section is not specially noisy. The after-section behind the bomb-bay is also without soundproofing, but it suffers from vibration more than from noise.

For a few hours, these conditions are quite bearable. On a long patrol, however, lasting perhaps a score of hours, the mechanical roaring and threshing can cause physical fatigue. By 42 Squadron standards this was not to be a long patrol, but in work of this kind the crews' duties are exacting and require that determination and concentration which, allied with skill, are the hallmark of the efficient airman.

When, at about mid-day, F/L. Ashworth pronounced the aircraft ready for take-off, the crew assembled, dressed for the flight

Ocean Patrol . . .

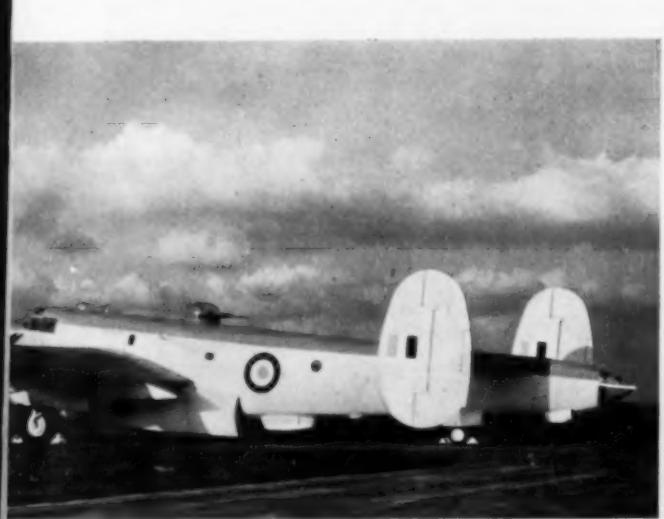
and took their places. The engines were started and the Shackleton taxied out to run-up. At 1225 we lined up for take-off. The engines were opened up against the brakes and water-methanol injection selected; the boost gauges showed + 28 lb. The Shackleton gathered itself like a rhino for the charge and bounded ponderously down the runway. It was airborne after a surprisingly short run and climbed away seawards.

Soon after take-off, we made a pre-arranged rendezvous with a Shackleton 1 carrying *Flight* photographer McLaren and circled together over the sea while the accompanying photographs were taken. Then a westerly course was set for the area in the Atlantic where the first exercises were to be carried out. I sat in the extreme nose, as in the bows of the ship, and watched the Atlantic drifting by below. The sun shone brightly between tufts of cloud and here and there a rain shower hung like a curtain in the middle distance. We made our way to a point in the Atlantic off the south of Ireland and there began a series of bombing and gunnery exercises. A smoke float was thrown out and two depth charges dropped on it. Next, a long series of bombing runs was carried out for the dropping of practice bombs from low altitude. The mid-upper gunner then climbed into his turret and, while the pilot circled the float, practised air-to-sea firing.

It was now late afternoon, and a northerly course was set which took us parallel to the Irish west coast, but out of sight of land. As we continued northward, three hours after take-off, the sun began to set; sea and sky assumed those gaudy blue, grey and copper shades so unbelievable when seen on picture postcards of the French Riviera. At one point the Shackleton trailed a magnificent double rainbow round its starboard wing; the effect lasted for some minutes until we flew into the thick of a rain-shower. As the evening darkened, and the horizon disappeared, the lights were switched on in the crew compartments. Most positions are provided with orange lamps, adjustable for angle and brightness. General lighting in the after-fuselage is by red lamps in the ceiling, which do not interfere with night vision.

Seven hours after take-off, flying somewhere north of Ireland,

Photogenic Shackleton: These "Flight" photographs, taken over the Atlantic during the patrol described in the article, give some idea of the sea and sky effects familiar to the Coastal Command crews. In the upper left-hand picture, taken soon after mid-day, the nearest land south-westward was probably the Azores, 1,500 miles distant. On the left, the aircraft presents a less graceful picture, for its light grey upper wing-surface is inevitably marred by the exhausts of the Griffons. (Below) The open camera-hatch under the extreme tail will be noticed.



we began to get our second wind. All except the captain had had a rest period and had eaten a hot meal. Tea and chocolate had been passed round at intervals.

A further exercise was now begun. For several hours we carried out a search procedure; messages were passed backwards and forwards over the intercom with the ceaseless drone of the Griffons as an ever-present background. The air became slightly bumpy, but soon after nine o'clock the clouds finally lifted, leaving only a few patches of mist. The engine exhausts glowed and sparks flew back over the wing and past the fins. Then the night turned cold and the aircraft structure became everywhere icy to the touch.

At about 2100 hr we set course for the final exercise area and watched the coastline slipping by on the radar screen. The area was reached shortly before midnight, and a series of night illumination exercises began. The pilot was "talked" on to a marker by the radar operator and at the psychological moment a stream of flares dropped on to the water a few hundred feet below. The immediate area of sea was bathed in a brilliant white-orange light by which the bomb-aimer was able to make out his target. When these flares were burning, the sea seemed very close; and the strong wind which had by this time sprung up added to natural vibrations in the tail to give us a rough ride. In these conditions, the sensation of lying in the extreme tail was what I imagine it would be like to lie in a cement-mixer. The fuselage shook and whipped, and the airstream for some reason sounded like gravel hurled against the walls. The extreme nose position, on the other hand, provided a sense of supreme detachment which, but for a slight draught, would have been most conducive to sleep. At this point, although not an habitual sufferer, I began to feel slightly airsick.

The flight had been scheduled to last 15 hours, but owing to prolonged orbiting at high revs in one of the exercise areas, and consequent high fuel consumption, it was decided to land after only 12¼ hours. Course was set for base and preparations made

Bank of props: This view of the Shackleton illustrates the alignment of the Rotol contra-rotating airscrews and the size of fins and rudders.

Ocean Patrol . . .

for landing; the galley cleared, loose equipment set in order and the final checks completed. The navigator and the captain carried out a practice Babs-Eureka approach, and shortly before the touch-down point was reached we went round again. The captain called for "undercarriage and flaps up," and the Shackleton simply climbed away from the ground without any perceptible change in the engine note. On such occasions as this, the aircraft gives proof of its ample reserves of power; three- or even two-engined flying presents no problems.

The final landing was made visually after a normal visual circuit. With a cross-wind from port, and the aircraft headed to port of the runway to counteract it, the captain, sitting on the left, has some difficulty in keeping the runway in sight because of the projecting nose-gunner's position. The landing, however, was uneventful; and, after a further engine run-up, we taxied back to dispersals. The time was 0110 hr.

I had been able to observe at close quarters most of the phases of the Shackleton's work, and was now able to appreciate the particular skill and perseverance required for what, to the uninitiated, must seem a simple task. A long patrol entails an even longer period of work for the crew. Their duties begin several hours before take-off with the careful preparation and loading of the aircraft, and in extensive briefing during the previous day. For a long patrol, especially if take-off is for some reason delayed, the crew may be continuously on duty for 30 hours or more. In order to keep in practice and to maintain efficiency at its highest possible level, long training flights such as the one described are regularly undertaken. In addition, the Shackletons are always prepared to go to the assistance of ships or aircraft in distress. On this occasion, we carried four large flares for use in a possible night search.

I left No. 42 Squadron's base with a healthy respect for the Shackleton crews who regularly and skilfully patrol the waters of the Atlantic and the Mediterranean. The Shackleton itself left a lasting impression of efficiency. C.M.L.

BEVERLEYS

—*and More Besides*

LAST week we gave some details of maximum-load tests conducted with the Blackburn and General Aircraft Beverley, in the course of which the accompanying photographs were taken. Concurrently in hand at Brough are tests of the French Turbo-méca gas turbines, which the company is preparing to manufacture under licence.

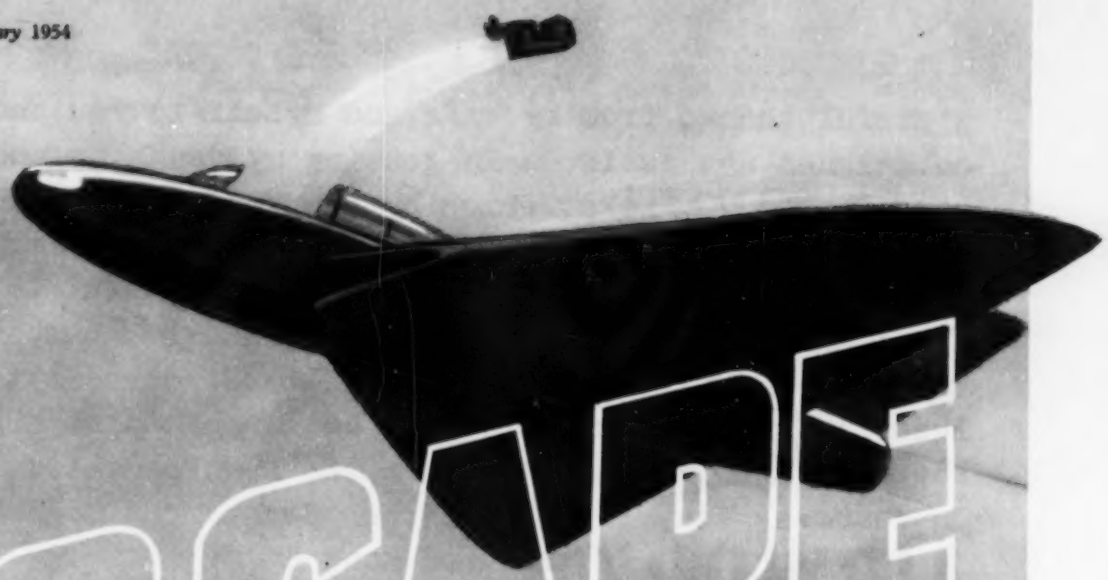
In point of size, these two products might be said to present the extremes of the company's current work. In between, and so far as aircraft are concerned, production covers a surprising variety of types and major components.

For instance, apart from completing preparations for Beverley production, the company are busy on Bristol Britannia fuselage parts and D.H. Venom tail booms and wing tanks; they are also completing the final batch of an order for Boulton Paul Balliols.

The Britannia fuselage shell is constructed in a series of large "planks" measuring approximately 3ft 6in by 15ft, according to the section of fuselage concerned. Nose and tail cones (the latter without tail surfaces) are built as complete structures; No. 7 nose section was very recently in the jig. As we noticed during a recent call at the works, the finish of these sections is excellent. The greatest care is taken to prevent scratching and scuffing, and each panel assembled is sprayed with a gold-coloured coat of protective plastic. Britannia production, incidentally, is progressively being moved to the Dumbarton works to make way for Beverley jigs.

Beverley fabrication is well under way, and the enormous jigs are everywhere to be seen. As we reported last week, the second prototype of the G.A.L. 60/Beverley has convincingly demonstrated its three- and two-engined performance. Test flights with the rear loading doors removed began last week and are continuing successfully.

With its undercarriage legs bearing witness to the load on board, the Beverley taxies out to a snow-covered Brough runway for maximum-weight tests. The take-off is seen in the picture above.



ESCAPE

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grateful thanks from my wife and myself to you and your colleagues who assisted in getting my daughter and son-in-home f ika, which by now you will have learnt t safe heir journey at Blackbushe yesterday aft noo re you we are most grateful to you all Fro ed by my daughter and her husband there no d that this service of yours is to say th least ful. They both speak most highly of the c on extended to them by all on board ar en route. What is more, I feel perh might like to know t t nature from journey, these coming from folk w used your service before.

AIRWORK

PASSENGERS

AIR THEIR

OPINIONS

When my daughter went out last yea and organisation other than yo they trave out on an I feel that they are perh in quite a good sition to judge. Th re only remain now for you to le indebtedness to and I when I wi ue by return

my husband and I would like to bring to your notice the quite exceptional efficiency of the air hostess on the Viking in which we flew to Wadi Seidna last Friday October 19th.

I feel that if thi your usual standard you to be congratulated at having arrived at a very high standard indeed. It would be a real pleasure to be able to look forward to the same crew

Having just completed a return journey to Nairobi in your line, I would like to place on record my appreciation for the excellent arrangements made for passengers at halting places on the way

I was most favourably impressed with all the arrange ments that were made, with the service of your personnel and with the efficiency attending the flights, and I should like you to know that these special

I arrived at BLACKBUSHE in your flight from Karachi, Pakistan yesterday and would like to let you know how efficient I thought the service was. Everything over which the crew had control

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The above are extracts from original letters which can be seen on request at 15 Chesterfield Street, London, W.1.

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AIR TRANSPORT DIVISION

AIRCRAFT INTELLIGENCE

MIDNIGHT-BLUE MONSTER: Sikorsky's XHR2S helicopter is remarkably like the homely Bristol 170—and is very nearly as big. Seen here swallowing a Mighty Mite (Jeep descendant) the Sikorsky is referred to on this page.

Great Britain

English Electric Fighter. For a considerable time we have noted references, in several foreign journals, to a fighter design from the English Electric Company. The latest, in *Aviation Week*, calls it the "F.23" and says that it will be a delta, powered by Sapphires. Two other journals have linked this machine with the Short S.B.5 research aircraft, while another reported nearly two years ago that the engines would be superimposed, "as on the Short S.A.4."

Canada

Avro Canada CF-105. After many months of rumours, official words have now been spoken regarding Avro's revolutionary fighter project, designated CF-105.

It will be a very weighty delta all-weather fighter, powered by two large turbojets—almost certainly Avro Canada Wacondas. The design Mach number is 2. Jim Floyd is named as the principal designer, and the prototype may fly in 1958.

United States

Lockheed XF-104. Mention of this lightweight fighter has frequently been made on this page; it is a supersonic, straight-wing machine, with very fine lines, and a prototype should fly this spring. The latest piece of news is that it will be fitted with a downward-ejection seat—an entirely new application of an old idea. Presumably a conventional pattern of seat will be used, sliding on back-rails and fired by cartridges. The pilot's harness will probably have to be exceptionally complete to withstand the g-load of ejection. Use of this seat may point to the XF-104 having a very tall fin.

North American FJ-4 Fury. Possibly the last major variant of the basic Sabre design, this carrier-based fighter embodies a re-designed wing of reduced thickness/chord ratio and a new tail with a large dorsal fin. Other likely modifications are a revision of the control surfaces, such as the fitting of a one-piece all-moving tailplane. The power unit remains a Sapphire. Production at Columbus will continue until 1956.

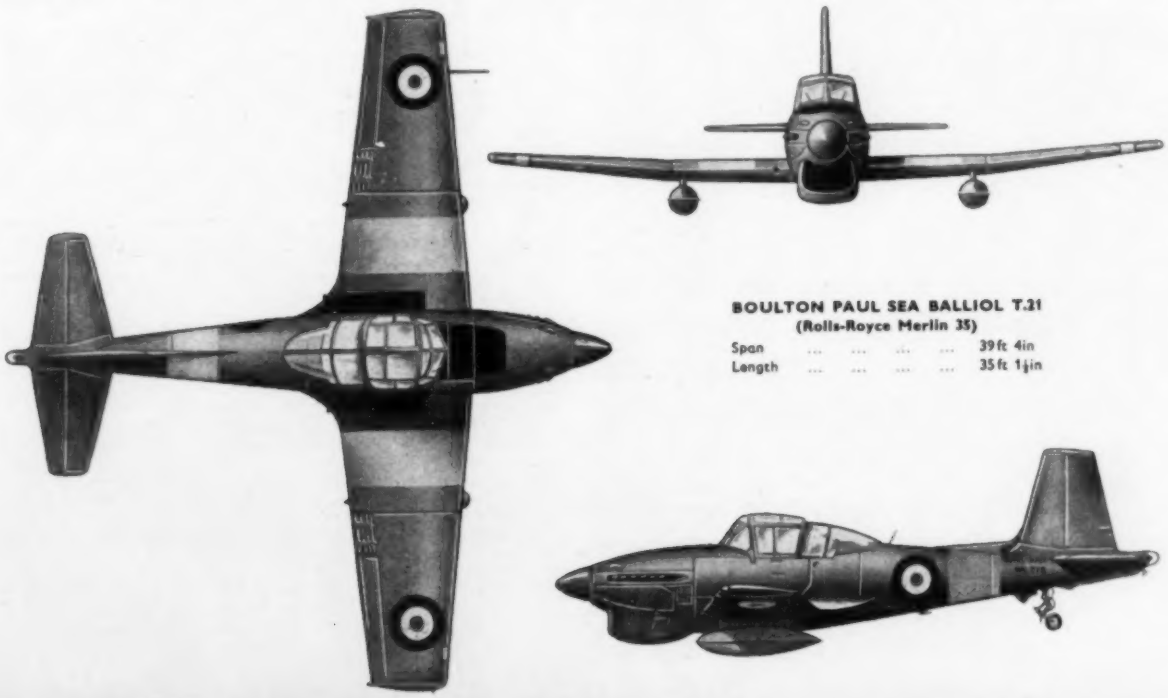
Republic F-84 Following Farnborough experiments with flexible-mat, wheels-up landings by a Sea Vampire, the same idea has caught on in America; the aim is, of course, the ultimate elimination of the undercarriage. Martin have modified a B-61 Matador launching ramp to accept an F-84 Thunderjet, which has been provided with a strengthened keel for belly landings. This method of launching would appear to involve rocket assistance with very high accelerations.

Sikorsky XHR2S. The first assault helicopter designed as such from the start—it was developed to U.S. Marine Corps' specifications—the prototype XHR2S is now flying at Bridgeport. The two 1,900 h.p. Double Wasps are mounted on the stub wings in large nacelles which also house the main undercarriage. The undercarriage retraction is quite logical in view of the machine's high performance, the cruising speed ranging from 150 to 170 m.p.h. The five-blade rotor is designed to retain efficiency should one blade be shot away and stability is increased by the provision of a fin and tailplane. The assault version is equipped with nylon flak curtains, and can carry 20-26 troops, a 105mm gun, or 5,500 lb cargo. In the photograph, intakes are visible in the nacelles, leading edge and rotor pylon.

France

Aubert P.A.300. Paul Aubert has begun to build a new light aircraft powered with a 135 h.p. Lycoming. Named the Grillon, it will be an all-metal, low-wing machine, seating two side-by-side and having retractable tricycle undercarriage. A prototype should fly in about nine weeks.

Fauvel Designs. M. Charles Fauvel, known for his flying wing glider, the AV.36, was working last winter on the AV.22, a tandem-two-seater development. Last November the AV.43 two-seater version, with a Turboméca Palas, was tested in a wind tunnel at Cannes.



BOULTON PAUL SEA BALLIOL T.21
(Rolls-Royce Merlin 35)

Span	...	...	...	...	39 ft 4 in
Length	...	...	...	...	35 ft 1½ in

DOUBLE CAPACITY HYDRAULIC PUMP

Basic Features of the Lockheed Mk 8 Unit

HYDRAULIC systems, like most things associated with aircraft, are becoming increasingly complex. Not only are jacks and hydraulic motors of greater capacity being required, but hydraulic power is becoming more and more widespread throughout aircraft. In a modern bomber, for example, hydraulic actuation may be required for main and nose undercarriage retraction, wheel brakes (perhaps on 16 wheels), flaps, air brakes, drooping leading edge, powered controls, bomb doors, entry doors or canopies, and various other services.

The Aircraft Division of the Lockheed Hydraulic Brake Company, Ltd., of Leamington Spa, are acutely aware of this trend, and they have now helped to meet it by providing a pump of unusually great capacity. Previously, their largest production-type pump was the widely known Mk 7 unit, delivering about 2½ gal/min at 3,000 lb/sq in pressure. The popularity of this pump is evident from the company's statement that they have sold "no fewer than 50,000 . . . during the past few years." The new pump, known as the Mk 8, broadly consists of two Mk 7s doubled up on a common shaft to give twice the output. Actually, there have been many detail refinements and changes brought about by the greater shaft torque and the advent of newer hydraulic fluids.

The Mk 8 pump employs 14 plungers in two rows disposed radially about the eccentric driving shaft. Compared with other pumps with fewer cylinders, the Mk 8 is noticeably smooth running; the two-throw eccentric shaft is fully balanced and the multiplicity of plungers evens out the delivery, so that the system is free from pressure pulses.

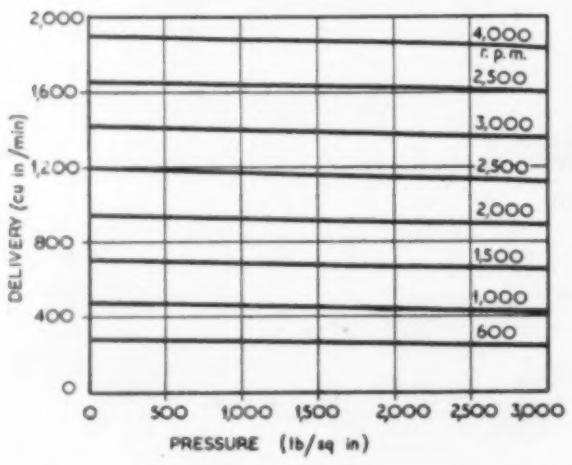
As in the earlier pump, no attempt has been made to incorporate off-loading devices, or (quoting Lockheed) "other features which might impair its efficiency or destroy its simplicity." As a result the pump should be highly reliable, and its weight of 14 lb is very competitive.

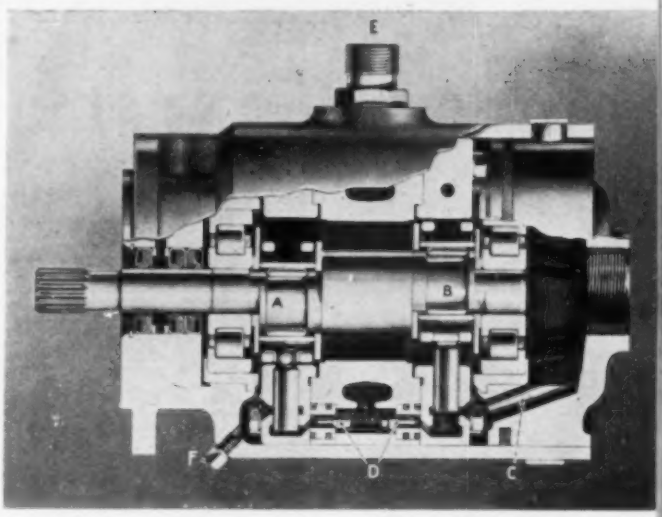
Fluid enters the pump on the centre-line through the end cover-plate, and then passes either down the centre of the pump to the "A" row of plungers (see diagram) or to the other row *via* the inlet passages, which are of new design.

The inlet porting is quite automatic, as it is on the Mk 7. Fluid enters each cylinder through a port cut in the cylinder wall and uncovered as the plunger nears bottom dead centre. On the return stroke the plunger covers the port and forces the trapped fluid out of the top of the cylinder, past a delivery valve and into an annular passage extending around the inner pump body into which is screwed the large-diameter outlet connection. This sequence of events can be followed with reference to the sectioned drawing, in which the two plungers shown are at opposite ends of the delivery stroke.

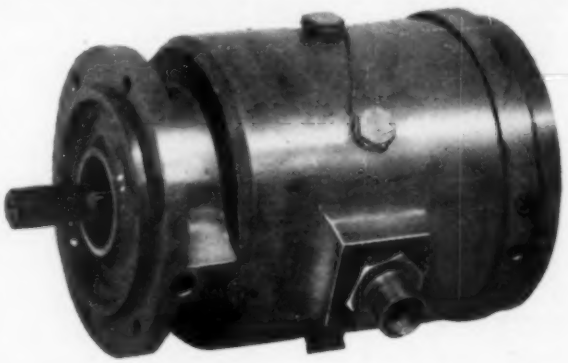
The drawing also shows constructional details, which are basically similar to those of the Mk 7 pump, although the general increase in material-sections is clearly evident. The main bearings are Hoffman parallel-roller units, of very adequate capacity. Their considerable size has been dictated partly by increased operating loads brought about by the greater length of eccentric shaft, and partly by the need to accept water-based hydraulic fluids, the "difficult" characteristics of which have always been a problem to bearing designers.

Curves of delivery at various speeds for the Mk 8 pump show that output is maintained almost independent of system pressure.





The new pump is shown below and, in sectioned form, above. The letters A and B denote the two rows of cylinders; C, D and E are, respectively, inlet passage, delivery valves and outlet, while F is an air-bleed screw.



These water-based fluids can be used in hydraulic systems associated with the Mk 8 pump, and it may be remembered that Lockheed exhibited a complete "safety" hydraulic system on their stand at Farnborough last year. The pump itself has done much running on such fluids—notably on E.E.L.6—and a particularly strenuous test has just been embarked upon. Other fluids causing some difficulty to many designers are the synthetic lubricants essential to modern military turbojets; the Lockheed Mk 8 pump incorporates special shaft-seals which are resistant to the attack of these oils.

Like most plunger-type pumps, the Mk 8 has a high mechanical efficiency (up to 90 per cent) and, as very little energy is dissipated as heat, the pump is noticeably cool in operation.

Little can be said regarding applications of this pump, for most of the aircraft which use it are new military types. It can, however, be said that the Mk 8 is fitted in the Comet 2 and 3 and, in the Comet 2 at least, makes possible a useful reduction in the number of pumps fitted as compared with the Comet 1. The importance of this last point is emphasized by the fact that hydraulic pumps are usually mounted on an accessory gearbox, of strictly limited dimensions, upon which space is at a premium.

Shortly, two versions of the Mk 8 pump will be made available, one employing the familiar bolted end-attachment and the other employing a side-clamp fitting and toggle ring. The latter mounting is in line with the present trend towards quick-release attachments.

Lockheed state that the performance quoted below "does not represent the pump's final development; when the need arises, it can be raised by an appreciable degree." It can also be announced that the company are now at work upon an entirely new design of hydraulic pump, which will have roughly twice the delivery of the Mk 8.

Mk 8 Performance Data: Rated max. working pressure, 3,000 lb/sq in; rated minimum delivery at 3,000 lb/sq in and 3,300 r.p.m., 5.12 gal/min; approximate drive horse power at full delivery, 12.9; overspeed at 3,000 lb/sq in, 4,000 r.p.m.; approximate dry weight, 14 lb.

STAMPS OLD and NEW

The Cairo Sale: Pictorial Issues from Lundy, France and Canada

AS was to be expected, stamp collectors all over the world are keenly interested in the forthcoming sale of the Egyptian Palace Collections. In all, there will be 1,143 lots; Egyptian stamps form the largest total, but several other countries are represented in the collections from the rest of the world.

Air issues are quite numerous, and some examples are illustrated here. Errors and imperforates are plentiful. The sale takes place from February 12th to 17th at Koubbeh Palace, Cairo. A 124-page illustrated catalogue can be purchased from H. R. Harmer, Ltd., 41 New Bond Street, London, W.1. The whole collection is valued at over £100,000.

Lundy Island issued its first postage stamps in 1929; jubilee celebrations are thus due to take place this year. The original stamps were current until the end of last year, and thirteen new stamps are now being issued to replace them. Seven of these are intended for surface mail; of pictorial type, they portray the Island, its Marisco Tavern and Castle, the North Light and

The newly issued set of six jubilee air mail stamps for Lundy Island. The reference to "Anzani the constructor" is curious, as he was responsible for engines rather than for airframes.

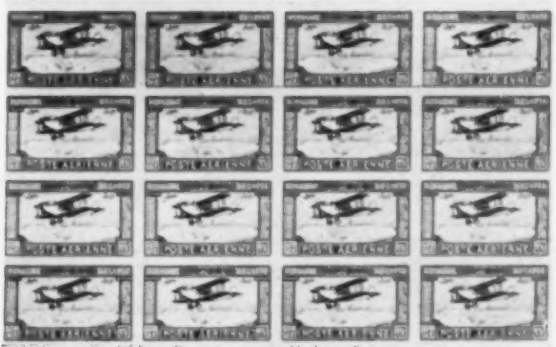
Constable Rock, and other features. The six air-mail stamps are illustrated on this page. The set is printed in two forms: the jubilee air-mails carrying the dates 1929-1954, as illustrated; and the second set of six values, printed without the dates and with the colours reversed. Incidentally, the name Lundy is derived from the Icelandic "Lunde Y," meaning Puffin Island, and the stamps bear denominations in puffins, the local-use coinage.

The French Post Office has this month started to issue several new stamps illustrating some of the latest French aircraft. They are intended for air-mail use, and the original engravings of the three from top to bottom, are by du Fresne (Marcel Dassault Mystère 4 intercepter), Gandon (Fouga Magister light jet trainer) and Serres (Bréguet Provence double-deck transport).

(Above) France and Canada: The Mystère is in blue and red; Provence in green-blue and dark grey; Fouga Magister in yellow and red. Large die proofs of the 1942-43 Canadian issue to publicize the country's contribution to the war effort were originally presented by the Postmaster-General of Canada to President Roosevelt.

(Right) A special royal printing in miniature, and without perforations, of the 1947 Egyptian air stamps; and a section of an imperforate sheet of fifty of the 1926-29 air stamps. The aircraft—which appears to be a D.H.34—pictured flying above the Nile.

(Below) Cairo Aviation Congress of October, 1946, with overprint inverted.



CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

In Defence of the Auxiliaries

UNWILLINGLY, I have recently become involved in a series of arguments on the status of the R.Aux.A.F. fighter squadrons. The general theme has been that the Auxiliaries serve no useful purpose in the defence of the country—that they even hinder it by enabling the Government to make up the total of fighter pilots on paper by employing "cheap part-time labour." This is considered to "take the bread out of the mouths" of aspirant Regulars who are turned down because the R.A.F. already has sufficient pilots. The Auxiliaries, furthermore, are accused of indulging a selfish enthusiasm for flying at the public expense. In the event of a war, it is maintained, the Auxiliaries would need as much time to convert to Hunters or Swifts as a man out of Civvy Street would take to learn to fly them from scratch.

These, to my mind, are disgraceful assertions. It has been proved before, and will if necessary be so again, that the Auxiliaries are the backbone of Fighter Command. They are made up of picked volunteers whose enthusiasm and (dare we use the word in these times?) patriotism has led them to devote the major part of their spare time to the complicated and not altogether sheltered business of fighter operation. They are part of the front line defence of Britain and would, if this country were again attacked, have to hold the fort until such people as those who made the above assertions had either found safe refuge or persuaded themselves to join the fray.

London, W.1. TWO-RINGER.

Red-and-Yellow Mysteries

REFERRING to Mr. H. E. Scrope's letter in *Flight* of January 8th, I was very interested to hear about the Monospar. I saw this machine, or one like it, with red fuselage, yellow wings and tail, and R.A.F. markings, at Martlesham Heath in January and February 1939. It was not a target aircraft. Several Monospars were used by the R.A.F. in the radio field.

I've never seen a gaily painted target aircraft. Pre-war Queen Bees and Queen Wasps had an all-silver finish. War-time Queen Bees had early fighter camouflage (green and brown upper surfaces, undersurfaces half black, half silver). Martinets were camouflaged, with yellow undersurfaces.

Jaywick, Essex. N. NUGENT.

"Puffs": R.C.A.F. Pilot's View

LIKE Oliver Stewart (November 20th), I also have been interested in the correspondence on supersonic bangs and "puffs." If I may be so bold, I should like to add fuel to the vapour-puff picture.

The explanation is very simple and an analogy may be made to illustrate the point. Most of us have seen aircraft do high-speed fly-pasts without any evidence of vapour trails until the aircraft is banked or turned sharply. These wing-tip vapour trails are usually seen under humid atmospheric conditions.

Similarly, during supersonic dives, the puff is not always seen, but is usually in evidence if the pilot has pulled out of his dive quickly. Obviously, if atmospheric conditions are suitable, a vapour trail will form during the pull-out. This can be verified by any pilot who has taken the trouble to investigate his own puff! In my own case, several investigations of the puff have shown it to be at the pull-out altitude; it resembles a small cumulus cloud.

My compliments to Mr. Stewart as an observant commentator. The procedure he uses is quite correct; but what does he do when there is no puff? I suggest that he ask the pilot to advise him when he passes through 25,000 ft and then allow himself approximately 22 seconds for the bang.

The fact that the puff is formed at pull-out altitude indicates that it is not caused by supersonic flight but by condensation. It may be formed at speeds less than supersonic.

R.A.F. Station Edmonton, Alberta. R. H. JANZEN, F/L.

[We are not anxious to reopen the "bangs" controversy unless and until new developments occur; but the above letter from Canada is so practical that we gladly make an exception.—Ed.]

Fog at L.A.P.

YOUR correspondent Mr. R. Williams (January 8th) has a very naïve idea of the powers of Government when he suggests that they "do something about it"—referring to the fog menace in relation to London Airport.

Ever since regular services began all governments interested in flying have done their utmost to mitigate the crippling effect of zero visibility by the maintenance of expensive meteorological services and experiments in all kinds of blind-landing apparatus; and, no doubt, if they had the power they would prevent winds of over 40 m.p.h., snow in the vicinity of aerodromes, and all the other hazards to safety.

I suggest that this correspondent takes a few lessons in elementary physics and meteorology before venturing into public discussion on such a matter.

Keston, Kent. J. BODEM.

[Our original correspondent, we feel sure, was aware of the efforts which Mr. Bodem mentions: his plea was for the use of Fido, or some other aid of equivalent or greater value.—Ed.]

Don't Go Down the Mine . . .

I READ with great interest your account (January 15th) of the development of new versions of the North American Sabre. I was particularly struck by your statements regarding the use of titanium and its alloys in some types of Sabre and Fury, in which the new metals are employed in bulk as a replacement for light alloys or steels.

Over the past few years we have had innumerable examples of the virtual non-existence of these alloys in this country—the recent Southampton production conference is an example—and I feel that this distressing position could easily be remedied. All that is required is an M.D.A.P. allocation of a squadron of F-86Ds to the Royal Air Force. By skilfully contrived brake failures or wheels-up landings, the aircraft could be speedily written off, and the extracted titanium made available to keep our own industry going for several years.

Liverpool. L. JONES.

FORTHCOMING EVENTS

Jan. 30. S.L.A.E. (S.E. Area): "Aircraft Design for Reliability and Ease of Servicing," by Cdr. (E) F. J. A. Nash, R.N.

Feb. 2. R.Ae.S. Graduates' and Students' Section: "Structural Analysis of Swept-back Wings," by D. Howe, D.C.Ae., G.I.Mech.E., Grad. R.Ae.S. (jointly with I.Mech.E. Graduates).

Feb. 3. Royal United Service Institution: "Operational Applications for Water-based Aircraft," by G/C. G. W. Williamson, O.B.E., M.C., F.R.Ae.S.

Feb. 4. R.Ae.S. Section Lecture: "Air Intake Efficiency," by F. B. Greatrex, B.A., A.F.R.Ae.S.

Feb. 5. Photogrammetric Society: "New Plotting Machine for Air Photographs," by J. E. Odle.

Feb. 6. British Interplanetary Society: "Progress towards Astronautics," by K. W. Gatland.

Feb. 10. Radar Association: "Some Unsolved Radar Problems," by K. E. Harris.

Feb. 11. R.Ae.S. Main Lecture: "Recent Developments in the Structural Approach to Aeroelastic Problems," by Dr. D. Williams, M.I.Mech.E., F.R.Ae.S.

Feb. 12. A.T.A. Association: Annual reunion dinner.

Feb. 13. British Interplanetary Society (Midlands Branch): "Astronautical Physics," by N. H. Langton, Ph.D.

Feb. 13. British Interplanetary Society (Provisional Yorkshire Branch): "Some Experimental Work on Rockets," by D. N. Hunter.

Feb. 18. R.Ae.S. Section Lecture: "Helicopter Research," by F. J. O'Hara, A.R.Ae.S. (jointly with the Helicopter Association).

Feb. 20. British Interplanetary Society (North-west Branch): "Building the Lunar Base," by R. A. Smith.

Feb. 23. R.Ae.C.: Film Show.

Feb. 24. R.Ae.C.: Dinner to speed and height record holders.

Feb. 24. R.Ae.S. Graduates' and Students' Section: "Aircraft Plastics," by Lorne Welch.

Feb. 25. Aerodrome Owners' Association: Annual general meeting and dinner.

Feb. 26. Institute of Transport: Annual dinner.

Feb. 27. British Interplanetary Society (Provisional Western Branch): "Provisioning of Interplanetary Vehicles," by G. L. Garthwaite.

R.Ae.S. Branch Fixtures (to Feb. 12).—Feb. 1, *Derby*, "Aeronautical and Industrial Application of Small Gas Turbines," by F. R. Bell; *Halton* films. Feb. 2, *Bristol*, "Operating Problems of the Transport Helicopter," by P. G. Masefield. Feb. 3, *Chester*, "Pioneer Flying," by H. Shaw (Joint meeting with Stanlow branch of Inst. of Pet.); *Brough*, "Design, Construction and Flight-testing of the Universal Freighter," by C. W. Prower, W. A. Hargreaves and G. R. Parker. Feb. 4, *I.O.W.*, "Development of Propellers," by H. R. Leather and T. Brett. Feb. 6, *Birmingham*, annual dinner.

Feb. 8, *Halton*, "Flight Simulators," by G. H. Hellings. Feb. 9, *Belfast*, "Engineering Problems of Airline Operation," by B. S. Shenstone. Feb. 10, *Weybridge*, "Navigational Aids," by W/C. G. N. Mackintosh, O.B.E. Feb. 12, *Glasgow*, film show (including "Story of the Century").

THE AERONAUTICAL BOOKSHELF

"Jane's All the World's Aircraft 1953-54." Compiled and edited by Leonard Bridgman. Sampson Low, Marston and Co. Ltd., 25 Gilbert Street, London, W.1. Illustrated. Price £4 4s.

FEW books reflect the temper of international relations better than *Jane's*. This year, for example, the conditions of "lukewarm war" account for the fact that of 113 powered aircraft illustrated in the British section all but 29 carry military markings. Similarly, out of 172 photographs of U.S. types, only 45 show civil aircraft. And, most significant and disappointing of all, the iron curtain has again kept the Russian section thin in both bulk and fact; although at least one Russian type—the large Mil helicopter photographed at the last Soviet Aviation Day display (see *Flight*, September 4th, 1953)—is omitted for no apparent reason.

Another sign of the times is the reappearance of Japan as an aircraft-manufacturing country. This year three light aeroplanes are illustrated in the Japanese section, with (for those with longer memories) disquieting hints of bigger and more lethal things to come.

With its traditional disdain for rumoured or insignificant aircraft, *Jane's* again overlooks a number of "one-off" and "home-made" types such as the Finnish PIK-11 light plane, and the Italian Manzolini and U.S. Schmidt helicopters. But there are dozens of photographs of other little-known aircraft from countries like Chile, the Philippines, Poland and Turkey; so this is small criticism of an old and trusted friend.

Those who revel in detail will be interested in references to the new Continental-powered version of the Avions Fairey Junior and the Volkswagen-engined Nipper; unmentionable new marks of Canberra and Meteor; and a remark that small rocket-propelled target-defence intercepters are being supplied in some numbers to the Russian Air Force.

"Boldness Be My Friend," by Richard Pape. Elek Books, Ltd., 14 Great James Street, London, W.C.1. Illustrated. Price 16s.

THIS book has all the necessary ingredients of a present-day best-seller—courage, the excitement of a real-life man-hunt and touches of sadistic cruelty and crudeness.

Richard Pape was navigator of an R.A.F. Stirling shot down after a successful raid on Goering's house, which was used as operational H.Q. for Berlin's air defences. Although wounded, he set out with the bomber's flight engineer to try to reach freedom. Almost at once there occurs an incident which sets the tone for the rest of the story. Instead of seeking the help of an elderly, somewhat witch-like Dutchwoman, they attack her violently and then steal all the food in her larder. Eventually they fall in with members of the Dutch Resistance, who arrange for them to be picked up by a British submarine at Leyden. But thick fog interferes with the rescue plan and, before a second attempt can be made, Pape and his colleague are captured by the Gestapo, together with several of the kindly, incredibly brave Dutch men and women, all of whom are subsequently tortured and executed.

Pape himself survives the attentions of the Gestapo, and the story goes on to describe his experiences in various prison camps, two unsuccessful escapes and his final repatriation as a rather phoney "incurable." As with previous escape books, readers cannot fail to be impressed by the ingenuity of British P.O.Ws, both in making their prison life more bearable and in escaping. Most will be left wondering whether Pape might not have reached home earlier if, during his attempted escapes, he had used less violence in his encounters with civilians in their own homes.

"Plastics Progress 1953—Papers and Discussions at the British Plastics Convention," edited by Phillip Morgan, M.A. Published for "British Plastics" by Iliffe and Sons, Ltd., Dorset House, Stamford Street, London, S.E.1. Illustrated. Price 50s.

THE papers and discussions reproduced in full in the 440 5¾in × 9in pages of this book constitute a work of reference of the greatest value not only to members of the plastics industry itself but also to others who make use of the materials in their own industries or who wish to learn how plastics can be best employed for specific purposes.

Several of the sections are of direct interest to the aircraft industry. There is, for example, the paper on *Plastics Containing Asbestos as a Reinforcing Filler*, by the R.A.E. team (Bishop, Gordon and McMullen) which has been working on the moulding of large components utilizing Durestos. Another study in the same field is Bancroft's (F. G. Miles Plastics Division) paper on the use of asbestos-reinforced materials, in which practical methods of vacuum and pressure moulding of aircraft components are reviewed in considerable detail. Glass-reinforced materials are discussed by Hulbert (of Scott, Bader and Co., Ltd., and formerly of the Bristol Aeroplane Co., Ltd.); the chemistry of low-pressure laminating resins is the subject of a paper by Yarsley and Goodchild; and Cole contributes a paper on the surface chemistry involved in the adhesion of glass and plastics.

Altogether, 22 papers are presented, together with verbatim reports of the discussions which followed the lectures given in each of the eight sessions of the 1953 Convention. Numerous half-tone and line illustrations amplify the text; and a minor, but praiseworthy feature is the inclusion of a portrait and brief biography of each contributor.

"Ultra High Frequency Propagation," by Henry R. Reed, Ph.D., and Carl M. Russell, M.S. John Wiley and Sons, Inc., New York; Chapman and Hall, Ltd., 37, Essex Street, London, W.C.2. Illustrated. British price, 76s.

WE do not recall ever having seen any single work which approached this volume in its coverage of what is still a rather specialized and little-understood field. The authors, and their assistants in preparing the book—W. M. Browne and J. W. Plummer, M.S.—are all attached to the U.S. Naval Air Test Center, Patuxent River, Maryland, much of the work of which is well known to our readers. The N.A.T.C. has long carried out intensive U.H.F. research and this book brings all that can be published between two covers. The static and dynamic performance of all practicable systems are discussed and the effect is shown of variation in related components. A wide range of possible applications is also considered.

"Oil." Cassell and Co., Ltd., 37/38 St. Andrews Hill, London, E.C.4. Illustrated. Price 8s 6d.

FIRST of a series on "British Industries," this book sets out to explain, in non-technical language, the growth and development of the oil industry and the methods by which oil is searched for, brought to the surface and refined.

Kellies, Christmas-trees, whip-stocks, cat-crackers—these and other curious terms in the oil men's jargon cease to mystify, and some excellent annotated drawings serve to amplify the explanations. Big half-tone illustrations, too, emphasize the grim beauty of some of the world's largest oil installations. Shell co-operated in producing the book, but it is in no sense a publicity brochure.

"Feathered Wings—a study of the Flight of Birds," by Anthony Jack. Methuen and Co., Ltd., 36 Essex Street, London, W.C.2. Illustrated. Price 15s.

THE author of this work says by way of introduction that in preparing it he divided previous books on the subject into two lots—those written before the Wright brothers flew, and those produced since. The early works, he observes, were written "by men wholly seized of the passion of flight; there is an enthusiasm, a madness, a brotherhood about some of them that belongs to airmen and not to ornithologists." The best of the later books were "thoughtful, staid works of science in which I have found most of what I believe to be the correct explanations of bird flight."

From such sources, and from his own knowledge as an enthusiastic observer since boyhood, Mr. Jack has distilled a most readable essence which strikes a nice balance between the entertainingly popular and the coldly scientific. "I think" (he says) "I should never have sorted the grain from the chaff if I had not myself been a pilot and had some grounding in the science of flight."

To all who are interested in the subject of bird flight we commend this painstaking effort; and so absorbing is it that many of those not previously interested may well become so after reading it—and after studying the admirable illustrations.

"Aeromodeller Annual 1953," compiled by D. J. Laidlaw-Dickson and C. S. Rushbrooke, F.S.M.A.E. Illustrated. Price 10s. The Model Aeronautical Press, Ltd., 38 Clarendon Road, Watford, Herts.

THE outstanding impression on looking through the latest edition of this practical annual is that within the past few years aeromodelling has graduated from the status of a hobby to that of a science: the number of design-charts, aerodynamic calculations, engine performance curves and electrical circuits (these last for radio models) is almost intimidating. Nevertheless, the scope of the book is so wide that there is also plenty for the less advanced enthusiast—for instance, seven pages, with dimensioned drawings, on how to make what is known as a "chuck glider" or, in other words, one thrown from the hand, paper-dart fashion.

And, talking of darts, delta and swept-wing models are very much to the fore in this edition; there are even instructions for building flying saucers. Many of the constructional articles deal with original designs from abroad, and the tabulated results of the year's flying contests, in particular, show what a truly international outlook aeromodellists have achieved.

THE INDUSTRY

Napier Apprentices do Well

AT the ninth annual presentation of indentures and awards to apprentices of D. Napier and Son, Ltd., held at Acton Town Hall on January 14th, executives of the company distributed six premier awards and 123 merit awards; the latter were cash prizes to a total value of £573. An address to the assembled apprentices and their parents was given by Professor W. R. Hawthorne, M.A., D.Sc., F.R.Ae.S., M.I.Mech.E., Professor of Applied Aerodynamics at Cambridge University.

The Company's Trophy went to D. W. Hobbs (technical assistant, piston engines), with L. R. Rust as runner-up; and M. S. Scott (jig and tool draughtsman) gained the Foremen's Trophy, with D. G. Cham as runner-up. These four were also awarded certificates of merit, as were D. E. Trigg and P. J. Bailey.

H.D.A. in Canada

FIRST details are announced of the plans of the Hawker Siddeley Group for their latest enterprise, the establishment of a Canadian subsidiary of High Duty Alloys, Ltd. The new company — registered as High Duty Alloys (Canada), Ltd—is already represented by a sales office, located in Toronto, and planning of manufacturing facilities is now in progress. Like the parent firm, with whose name are associated "Hiduminium" and "Magnuminium" alloys, the new company is to specialize in the production of high-quality castings, forgings and extrusions for both the defence and the industrial markets, though the emphasis is likely to be on the latter aspect. Mr. Crawford Gordon, Jnr., president and general manager of A. V. Roe Canada, Ltd., has been appointed president.

Mr. R. G. Murley, from Slough, directs H.D.A. (Canada) Sales.

AT THE NAPIER PRIZE-GIVING, technical assistant D. W. Hobbs receives the Company's Trophy from the managing director, Mr. H. Sammons, C.B.E., M.I.Mech.E., F.R.Ae.S., F.R.S.A.

Bristol Personnel Manager Retires

MR. F. R. IMISON, chief personnel manager of the Bristol Aeroplane Co., Ltd., since 1939, who has just retired, has the unique record of a link with the chairman of the company (Sir William Verdon Smith) extending over fifty years.

The association began in 1903, when Mr. Imison joined London United Tramways under the chairman (then Mr. W. G. Verdon Smith), and remained unbroken to the day of Mr. Imison's retirement. Mr. Imison transferred to the Bristol Tramways and Carriage Co., Ltd., in 1913, was appointed staff manager, and for some twenty years was chairman of the company's sports association.

It was at the invitation of Sir William that he joined the Bristol Aeroplane Co. in 1939. He was chairman of the company's welfare association from its inception and, in addition, held a number of important public posts in West of England industrial circles.

To mark the occasion of his retirement a cheque from his colleagues, and an illuminated address, were recently presented to him. Sir Reginald Verdon Smith (joint managing director) presided at the ceremony.

IN BRIEF

Following the resignation of Mr. W. B. Hickman, secretary of Westland Aircraft, Ltd., Mr. C. T. Jones, A.S.A.A., has been appointed to the post.

* * *

Mr. A. E. Underwood, executive director of the Plessey Co., Ltd., has been appointed a director of Plessey International, Ltd., the overseas sales organization for the products of the group. He has been an executive director of the parent organization for the past three years.

Mr. W. G. Thomas, M.Inst.F., has been elected a director of Radiovisor Parent, Ltd., 1 Stanhope Street, London, N.W.1., manufacturers of photo-electric and electronic controls.

* * *

The make of the Heron's STR.9X V.H.F. set, mentioned last week, should have read "Standard"—with a capital "S."

* * *

At the Northern Aluminium Company's foundry and forge, Handsworth, Birmingham, Mr. F. Howitt relinquishes the position of technical superintendent and deputy manager on being transferred to a sister company, Aluminium Co. of Canada, Ltd., Montreal. Mr. S. Wilding, appointed production manager, is succeeded as works engineer by Mr. D. A. Ellis. Mr. A. R. Martin assumes the full responsibilities of chief metallurgist.

* * *

Ragosine Oil Co., Ltd., anounce that they have formed a subsidiary company, Rocol, Ltd., for the manufacture of their speciality products — Ragosine anti-scuffing paste, Ragosine molybdenised lubricants, Kilopoise lubricants, core-locking compounds, watch and clock oils, and R.T.D. compound. Offices are at Ibex House, Minories, London, E.C.3 (Royal 4372), and works at Minerva Works, Woodlesford, near Leeds (Rathwell 2164).

THE SECRETARY OF STATE FOR AIR, Lord De L'Isle and Dudley, V.C., recently visited English Electric at Preston, Warton and Samlesbury. Left to right, examining test equipment at Warton, are Mr. H. G. Nelson, M.A., M.I.Mech.E., M.I.E.E., M.I.C.E. (deputy managing director), Mr. F. W. Page, B.A., F.R.Ae.S. (chief engineer, aircraft), the Minister, and Mr. W. Shorrock, M.B.E. (manager of the Preston factory).

CIVIL AVIATION

G-AMXA, subject of this impressive pre-dawn picture at Hatfield, is seen in the view, below, as it climbed away steeply, in spite of its full load, under the thrust of its four Rolls-Royce Avons.
"Flight" photographs

SERIES 2 COMET IN AFRICA

Record-breaking Trip to Khartoum for Tropical Trials

GOING to Africa on January 22nd for its tropical trials, the first production de Havilland Series 2 Comet, G-AMXA, made what the makers announced beforehand as a "fast flight, an incidental part of routine trials . . . in order that the performance tests may be concluded without delay." It was also expected to break the London-Khartoum record.

Whether or not the intention was incidentally to demonstrate the commercial possibilities of the Avon-engined type, in the event the flight did so most effectively; and if (which we doubt) the public needed any re-assurance at all as to Comet capabilities this also was provided. The newspapers accorded the achievement generous publicity. It is beside the point that so long as G-AMXA kept airborne it could not very well have avoided breaking the record, which stood at a modest 213 m.p.h. to the credit of Lincoln Aries III (S/L. J. C. T. Downey) in 1950.

Captained by John Cunningham, chief test pilot, with Peter Bugge as co-pilot, the Comet covered the 3,080.6 statute miles (great-circle distance, airport to airport) in 6 hr 22 min 7.2 sec. Officially observed by the R.Ae.C., the flight represents a centre-to-centre average speed of 481.1 m.p.h. and will thus rank as a capital-to-capital record when the figures are confirmed.

The start was in clear, calm conditions at 0740 hr 9 sec, soon after daybreak, and the take-off was made from south to north—an unusual direction at Hatfield. That the aircraft used most of the runway was understandable, for although the human load was only 13 (in service the Series 2 will carry 44 passengers, baggage, and six crew) there was ballast on board to bring the all-up weight to the maximum figure of 120,000 lb. In the tanks were 6,920 gallons (55,300 lb) of fuel. "Payload" was therefore about 10,500 lb, or 80 per cent of the normal capacity load.

The flight was wholly uneventful. On arrival at Khartoum, where there was a warm welcome from a crowd of 500, John Cunningham said that there had been cloud over Britain and France and some fog over Italy, but that the sky had been clear from the North African coast onward. Maximum altitude reached

was 43,000ft, and -XA finished the journey with about 1,200 gallons still in the tanks.

It is expected that the African trials will be completed in about one week's time. They are being made from Khartoum, where day temperatures at this time of year are around 100 deg F, and from Jan Smuts Airport, Johannesburg, which is some 5,000ft a.m.s.l. These tropical tests form the last phase in the C. of A. trials of G-AMXA; as the first of B.O.A.C.'s 12 Series 2s, the aircraft is due for delivery this spring.

On board for the record flight, and to participate in the trials, were the following D.H. personnel in addition to the captain and co-pilot: R. W. Chandler (chief radio officer), E. Brackstone-Brown and F. J. Reynolds (engineers), A. J. Fairbrother (aerodynamics observer), J. Marshall (instrument specialist) and J. Crombie (inspection department). From B.O.A.C. came Capts. H. J. Field and A. M. A. Majendie; H. G. Radlett and T. E. R. Burden represented the A.R.B.; and A. M. Stephen participated on behalf of Rolls-Royce, Ltd.

John Cunningham (right) and Peter Bugge go aboard. At least one London newspaper commented rather wonderingly on their "lounge suits."
"Flight" photograph

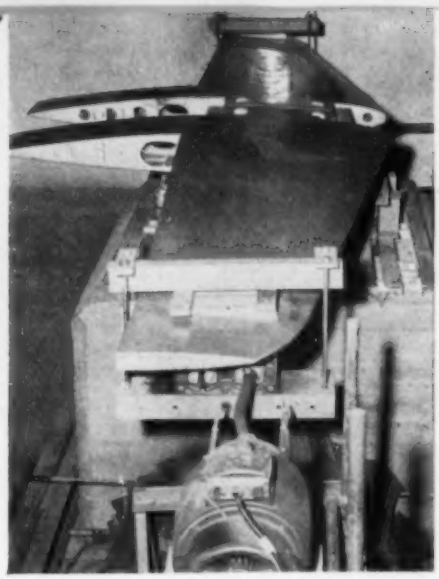
FARNBOROUGH COMET INVESTIGATIONS

IT is not often that details of R.A.E. research and investigation methods are made public other than in official publications and the proceedings of the learned societies; even less frequently are newspaper representatives permitted to see investigations actually in progress. In view of the wide public concern over the Elba accident it was a wise move to invite Pressmen to Farnborough, as was done on January 20th, and to give easily understandable explanations of a very complex subject.

The visitors on this unusual occasion were welcomed by the Director of the R.A.E., Professor A. A. Hall, M.A., F.R.Ae.S., and then handed over to Dr. P. B. Walker, M.A., Ph.D., F.R.Ae.S., Head of the Structures Department, who demonstrated and explained component-testing methods, vibration wing-testing, "slow-load" fatigue tests on the specimen prototype Comet, and the investigation—in the accident-reconstruction hangar—of the wreckage of Comet G-ALYV, destroyed near Calcutta last May.

In addition to hearing Dr. Walker's comments, and his answers to questions, a written explanation was issued, portions of which we quote here in slightly abridged form.

Fatigue. In the prevention of fatigue failure [said the statement] the first objective is to measure the gusts or bumps that are the cause of the trouble. In recent years a new instrument called the counting accelerometer has been invented and developed at R.A.E.; it not only counts the gusts but also grades them according to severity. With this instrument all British air routes have been surveyed for practically



COMET TESTS AT FARNBOROUGH: Giving valuable service to the very end: the first prototype Comet, G-ALVG, as it appears while undergoing the R.A.E.'s "slow-loading" test for fatigue in the wing structure, as described below. Flexion at the wing-tip, under the action of the hydraulic rams, is about 1 ft. On the right is one of the 60 Meteor tail-planes—which have served as miniature wing test-specimens—being vibrated to eventual destruction by a motor-driven eccentric.

CIVIL AVIATION . . .

every British civil type in regular use. Another instrument, only recently perfected, is the "fatigue meter," which could be permanently fitted, as supplies become available, to individual aircraft. It will record the life history of the aircraft in terms of bumps.

The main safeguard against fatigue failure is the limitation on flying life that is rigidly imposed by the A.R.B., the aircraft being withdrawn from service when its "safe" life is deemed to have expired. Calculations of life are based upon the gust measurements just mentioned and upon tests of specimens of the actual structures. All the main components—especially joints—of all civil aircraft are fatigue-tested to destruction, and the tests are repeated on at least six specimens of each component.

The R.A.E. have two component-testing machines in continuous use. In each of these machines a reciprocating load is applied by heavy weights vibrating on powerful springs, and this load is superimposed on a steady load corresponding to steady level flight.

For all practical purposes the component is loaded as if in flight; the test, however, takes place much faster, so that one second is equivalent in effect to about one hour of flight. This speeding-up permits the fatigue life to be determined early in the operating life.

The R.A.E. has no monopoly of this kind of work, which is also undertaken by civil aircraft firms; Farnborough is the focal centre.

In addition to testing components such as joints, the R.A.E. tests complete wing systems, and even complete aircraft. Two quite different techniques have been evolved. In the first the wings are made to vibrate naturally; no springs or weights are required, these being provided by the structure itself. The Establishment have tested sixty identical Meteor tailplanes to destruction by this method. [Dr. Walker remarked that these were not scrapped components, but new ones from the production jigs—Ed.] These tests have nothing to do with the Meteor as an aircraft, since the tailplane was treated as a small-scale wing and loaded accordingly. Exhaustive research was carried out on these lines, including tests at low temperatures such as occur at 40,000ft. The technique culminated in a vibration-test of the wing of a York.

The difficulties in testing wings of large span—the first fatigue failure in the York test was in the testing rig and not in the aircraft—led to another method which is often preferred. In this the loads are applied by hydraulic rams. This method is known as the "slow-loading" method, but the term is relative, since one minute of testing time is equal to about one hour of flight. The prototype Comet is being tested at R.A.E. at the present time by this method. [Dr. Walker said that this aircraft had already been "flown," under test, three times longer than any Comet in B.O.A.C. service; no fatigue had been experienced of a kind likely to affect airworthiness—Ed.]

Accident Investigation. After the formal inquiry into the Calcutta accident by the authorities in India, a large proportion of the parts of Comet G-ALYV, collected over an area of many square miles, were sent to Farnborough by air. Other parts were sent later on request. The R.A.E. then began their task of reconstruction, which continued for several months. The parts are laid out on the floor of a special hangar, so far as possible in their correct relative positions corresponding to an unbroken aircraft.

The investigation in this case followed well-defined lines. The position of every part as it fell on the ground was plotted on a map. [Wind and height, and the speed at which various parts would fall, were also taken into account—Ed.] From this it was possible to deduce the order in which the parts broke away. Scratches and dents, and paint marks on the broken parts, were then examined for further clues to the sequence of failure. The presence of fire which gutted the main wreckage rendered the task more difficult, but even this was turned to advantage in one respect: to the deductions drawn from dents and scratches were added those derived from blistered paint, burned surfaces and smoke marks.

As a result of this reconstruction and analysis, lightning strike and explosion had been dismissed as causes of the accident. Fire was shown to be secondary, having occurred following the structural failure and as a result of it. The sequence of failure was also established: first one tailplane then the other, followed shortly by one wing and then the other. The investigation is now proceeding in an endeavour to find what led to these events; no structural weakness in the aircraft has been found, and it therefore seems either that some event occurred which led it into a very abnormal condition of flight or that it encountered weather which would have broken any aeroplane.

THE ELBA SEARCH

SEARCH for the main wreckage of B.O.A.C. Comet G-ALYP, lost in unexplained circumstances off the island of Elba on January 10th, was proceeding intensively last week. The fuselage was believed to be lying at a depth of over 500ft, and the frigate *Wrangler*, assisted by a buoy-layer and other vessels of the Royal Navy, was conducting an echo-sounder search over some three square miles. Many contacts were received, and by the week-end *Wrangler* was reported to be concentrating on three objects which were giving major echoes. The next step was to investigate these with the aid of deep-water television equipment that was on its way from Malta in the salvage vessels *Sea Salvor* and *Barhill*.

Meanwhile, various small pieces of floating wreckage had been brought ashore by fishermen and other searchers. *Post mortem* examinations of the 15 bodies recovered had been concluded by Sir Harold Whittingham, B.O.A.C.'s Director of Medical Services, and G/C. W. K. Stewart, of the Institute of Aviation Medicine. Mr. Lennox-Boyd, Minister of Transport and Civil Aviation, attended the funeral and returned to England to make a statement —quoted below—in the House of Commons.

In England, day-and-night examination was continued of the Comet fleet, which B.O.A.C. had voluntarily withdrawn from service immediately after the accident. Two (-YU and -YY) were completely dismantled, and others were subjected to detailed checks of specific services—hydraulics, electrics, and so forth. It was announced that crew-training flights would be resumed as the examinations were completed, and on January 18th the first of these took place, when G-ANAV (Capt. K. G. Griffin, with a crew of six) flew from London Airport to Hurn and made a number of circuits and landings.

G-ALYP: COMMONS STATEMENT

UNANIMOUS approval was accorded to Mr. Alan Lennox-Boyd, Minister of Transport and Civil Aviation, when, in his statement to the House of Commons on Thursday of last week, he stressed the need to await the findings of the inquiry before forming judgment on the accident to Comet G-ALYP.

In particular the Minister was anxious to make it clear that no more importance should be attached to the possibility of sabotage—which could not, of course, be ruled out—than to many other causes. Indeed he thought it would be a great tragedy if the feeling that something of this kind was responsible were allowed to handicap the vigour with which other possible causes were examined.

Mr. Lennox-Boyd went on to explain that, while the original decision to suspend passenger-carrying operations had been taken by Sir Miles Thomas, chairman of B.O.A.C.—to permit "a minute and unhurried" examination—it would be his own responsibility as Minister to decide what recommendations to make to the Corporation for the restarting of the service.

He assured the House that there could be no question of this matter not being faced up to long before the report of the tribunal was arrived at, and he was very conscious of the need for as early action as possible being taken as he knew the value of the Comet service.

Mr. Frank Beswick (Lab., Uxbridge) said that the House would wish to express its appreciation of the resolute way in which the Corporation, led by their chairman, met this severe but, it was hoped, temporary setback, and in particular their courage in deciding to suspend the service pending an examination, even though such a decision was liable to misinterpretation. "We should do our best," he said, "to damp down speculation until the evidence has been sifted." [A ludicrous example is reported from America, where an "aviation correspondent" has advanced the theory that a strong tail-wind caused the Comet to exceed its critical Mach number.]

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BROKEN JOURNEY

TO compensate him for the inconvenience caused by an unscheduled landing at Managua, Nicaragua, Edelberto Torres is reported to be suing P.A.W.A. for $200,000. Torres, a political refugee from Nicaragua, booked for a flight from Guatemala to Nicaragua. When the aircraft landed at Managua he was arrested and imprisoned for six months.

AIR-INDIA COMET TRAINING

FOUR pilot-executives of Air-India International arrived at Hatfield on Monday to begin what is described as a "Comet appreciation course." They were expected to fly in a Comet this week, but most of the course will be spent on the ground studying technical and operational aspects of the aircraft. Recently nationalized, this Indian "flag carrier" has ordered two Comet 3s for the London-Bombay-Tokyo service. The Indians concerned are A. C. Gazdar, operations manager; K. Vishvanath, assistant operations manager; K. R. Gazdar, London flight superintendent; and V. N. Shirodkar, chief pilot.

U.S. AIRLINES' SAFETY RECORD

ACCIDENTS to American airliners operating scheduled domestic services last year involved the deaths of 86 passengers, out of an estimated total of 28.4m. Expressed on the customary basis of fatalities per 100m passenger miles, the index for 1953 works out at 0.6, compared with 0.4 in 1952. American overseas scheduled operators carried some 2½m passengers with only two deaths, corresponding to 0.06 fatalities per 100m passenger-miles; this compares very favourably with the 1952 index of 3.00. The sum effect of both domestic and international services by American operators in 1953, according to an unofficial but reliable estimate, was a record low passenger fatality rate of 0.5 per 100m passenger miles, the total traffic being 31m passengers and 19,000m passenger miles.

W.A.A.C. TO WITHDRAW MARATHONS

FROM April 1st, the six 18-seat H.P.R. Marathons operated by West African Airways Corporation are to be withdrawn from service and offered for sale, probably because their capacity is too large for the traffic available. They have been in service for little more than a year, and the London company holding the selling rights quotes the total hours as varying from 350-1,250 hr. There is no immediate intention of buying new aircraft to replace the Marathons, and their routes will be taken over by the Corporation's remaining machines—ten Doves and five Bristol 170s.

CUTS FOR K.L.M. AND PANAM

FOLLOWING the inauguration of a T.C.A. service between Montreal and Mexico on January 16th, K.L.M.'s temporary traffic rights on the Montreal-Mexico City sector of their services from Amsterdam have been withdrawn. For similar reasons, fifth-freedom rights are also to be withdrawn from another big international airline, P.A.W.A. Later this year the Portuguese airline T.A.P. will begin to operate its own DC-6s on the Lisbon-Johannesburg route, and from June 30th PanAm will be permitted to operate only one return service weekly instead of two as at present. As soon as T.A.P. build up to a twice-weekly frequency the American company will probably cease routeing its New York-Johannesburg service *via* Lisbon.

HELICOPTER HANDBOOK

HELD at Puerto Rico in April last year, the I.A.T.A. Helicopter Symposium has been described as ". . . the first occasion in history on which the designers and potential users of a new kind of transportation have been able to discuss in advance the measures necessary to bring it into widespread public service as quickly, efficiently and economically as possible." A 70,000-word edited record of the symposium, entitled *Helicopter Operation and Design Requirements*, has now been published by I.A.T.A., and copies are being sold at $6 (U.S.) from the Association's headquarters at International Aviation Building, Montreal 3, Canada. Details of purchase in the sterling area are not yet available.

The price seems rather high, but in fact we are assured by I.A.T.A. that the book is being sold at cost to achieve the widest possible circulation. It certainly deserves very close attention in the widening circle of people interested in the evolution of future rotorcraft. The book summarizes discussions between senior representatives of 35 civil and military operators as well as 44 other agencies—manufacturers of equipment, aircraft and engines; Government and municipal authorities; international associations; and learned bodies. In addition, there are supplements containing a joint paper by B.E.A. and Sabena on future operational problems, and a Ministry of Supply paper on cockpit layout.

The value of interchanging experience on such a scale can scarcely be underrated. One feels that a similar conference on fixed-wing transport aircraft, if held immediately after the war, might have prevented a great deal of wasted effort on prototypes completely unsuited to operators' requirements.

The following chapter headings from the I.A.T.A. book give an idea of the scope of the Puerto Rico discussions: Transport rôles of the helicopter; route characteristics; operations; design characteristics; heliport requirements; passenger handling procedures; economics.

AMSTERDAM EXPANSION

CONSIDERABLE increases in traffic during 1953 are reported from Schiphol Airport, Amsterdam. Last year the airport handled 565,000 passengers, 17,550 tons of freight, 3,150 tons of mail and 10,000 tons of baggage—increases of respectively 16, 9, 4 and 13 per cent over the totals for 1952. The number of aircraft movements was 31,184. Employees at Schiphol now total 10,000, of whom 6,000 now work for K.L.M., and the number of companies represented there is 90 (including shops).

More than five million sightseers have visited the airport since it was re-opened to the public in July 1946. The 1953 total of 896,000 reflects both the Netherlander's interest in aviation and the quality of the facilities provided for him at Schiphol—including restaurants, roof terraces and a miniature train.

A significant contrast is provided by London Airport, which handled more than twice as many passengers as Schiphol last year but attracted fewer sightseers—a total of 520,000. However, the new terminal buildings now under construction at L.A.P. include ample provision for visitors, which should ensure much greater public attendance at what is, technically, beyond doubt the finest civil airport in Europe.

VISCOUNT CUSTOMER?

IT was reported last Saturday that Mr. Roy Chalk, described as president of Trans-Caribbean Airlines, had expressed hopes of signing a contract for three Viscounts "within 60 days." Trans-Caribbean is a non-scheduled company based in Florida which operates a small fleet of DC-4s—mainly on a time-charter basis for other airlines.

Vickers-Armstrongs confirm that Mr. Chalk visited their factory at Weybridge last week, where he spent some days discussing performance figures and route analyses. He also flew in a Viscount and showed great interest in the potentialities of the Series 700D (which is basically similar to the 720s ordered by T.A.A.). There is a familiar ring to the news that Mr. Chalk's original desire was to take delivery of two or three Viscounts in six months' time. Even on learning that autumn 1955 was the earliest possible delivery date, however, he remained enthusiastic about the Viscount and took away from Weybridge numerous brochures and manuals as a basis for consultations with his pilots and engineers.

SUPERSONIC TURBOPROPS FORECAST

SPEEDS of up to 800 m.p.h. with turboprop aircraft were forecast in a statement issued earlier this month by the general manager of the Hamilton Standard division of the United Aircraft Corporation, Mr. Erle Martin. He said that the Turbo-Hydromatic airscrews recently delivered for the P. and W. T-34s which will be installed in advanced military versions of the Super Constellation were capable of handling the powers and speeds of any turboprop aircraft of the immediate future. The theme of Mr. Martin's case for the turboprop was that this form of power-unit is already more efficient than the pure jet in most respects, and that future improvements to the "gas generator"—which is common to both types—would increase the superiority of the turboprop.

Lower noise-level, shorter take-off, steeper climb and simpler thrust-reversal for landing were among the advantages quoted for the turboprop-powered transport. On U.S. domestic routes, Mr. Martin estimated, the turboprop would be ten per cent cheaper to operate for the same cruising speed, and on trans-atlantic routes the turboprop would be 30 per cent more economical. He claimed that a 75-seat transport with 8,300 h.p. turboprops, flying from Paris to New York, would have the following advantages over one powered by 9,500 lb thrust turbojets: higher cruising and block speeds; approximately one-third lighter for take-off and one-fifth lighter for landing; smaller wing area; and lower direct operating cost.

Pertinent to turbojet versus turboprop arguments, incidentally, are some comments which we heard recently from a very well known designer in this country: he believes that the by-pass engine is an outstandingly important development. Its fuel consumption and economics, he thinks, must be separated very distinctly from those of pure jets; in fact, it is likely to prove a serious rival to the turboprop, with additional advantages of a large speed bonus.

BREVITIES

AUTOMATIC reservation equipment of the type introduced at B.E.A.'s London sales H.Q. was officially opened at the Dub'in booking office of Aer Lingus last month by Mr. Erskine Childers, Minister for Posts and Telegraphs. The system can "memorize" the booking status on up to 200 flights daily for a period of three months ahead.

* * *

Fluorescent lighting equipment valued at over £70,000 has been ordered from the General Electric Co. for B.O.A.C.'s engineering and administrative headquarters at London Airport. The order is described as one of the largest ever placed for the lighting of a single building.

* * *

A total of 300,000 passengers flew on B.E.A.'s Channel Islands routes last year—28,000 more than in 1952. The busiest route was that between London and Jersey, which attracted 126,000 passengers; a further 60,000 flew between Jersey and Southampton, Manchester, Birmingham, Liverpool and Glasgow.

* * *

The Indian Minister of Communications is reported to be studying a plan for compulsory insurance of all passengers travelling on the domestic services of the Indian Airlines Corporation. A figure of 10 rupees (about 15s) for insurance of 100,000 rupees, over a period of 24 hours, has been suggested as a premium; this would be added to the cost of the ticket.

* * *

The Finance Committee of the Nottingham City Council is considering the possibilities of developing Tollerton airfield as an airport. Tollerton is at present requisitioned by the Air Ministry, but it is reported that the latter is anxious to return it to private ownership.

* * *

P.A.W.A. intend to inaugurate a New York - Berlin tourist service on June 1st. Flights will be operated twice weekly in each direction, with stops at Prestwick and Hamburg.

* * *

For the first time in its history America's second largest airline, T.W.A., has carried more than three million passengers in a year. Precise figures are not yet available, but the 1953 total number of passengers carried on T.W.A. domestic and international services last year is expected to exceed the 1952 figure (2.57m) by more than 20 per cent.

* * *

Following the delivery of five Convair 240s and two DC-6Bs to Canadian Pacific Airlines, DC-3s are being replaced on the company's domestic routes by both Convairs and DC-4s. The DC-6Bs used on the Pacific routes will be joined next autumn by Comets; C.P.A. have ordered three Series 2s and hold an option on a fourth.

* * *

This year Japan Air Lines intend to inaugurate services from Tokyo to Sao Paulo, Bangkok, Seoul and Karachi. Djakarta will be added to the list of destinations served next year, and the airline also expects to introduce Comet 2s in 1955 on a route between Tokyo and London *via* Karachi. The company's first international services, to San Francisco *via* Hawaii, and to Wake Island, will be inaugurated next month.

CLUB AND GLIDING NEWS

THE annual report of the Blackpool and Fylde Aero Club, Ltd.—read by the president, Mr. R. Whyham, at the recent annual general meeting—showed that the club had had a successful year. Flying hours had totalled 1,586; 18 members had obtained their P.P.L.s and 25 had achieved their first solos.

Two of the club's Austers have been equipped for night flying and several members intend to obtain their night ratings. A Link trainer is being installed for instrument practice and it is planned to fit one or more of the aircraft with radio. Flying target for 1954 is 2,000 hours.

Eight types of single- and twin-engined aircraft are at the disposal of members, and twin-rating conversions for Commercial Licence holders or members are available, that for the Rapide at an inclusive cost of £14 10s. Blackpool and Fylde is anxious to arrange reciprocal flying events with other clubs.

A LUNCH patrol with a difference is to be held at Denham Airfield by the Vintage Aeroplane Club on Sunday, February 14th. Defending aircraft will carry cameramen, who will photograph attackers to confirm interceptions; prints will be developed during lunch. In addition, attacking aircraft will have to bomb a "battleship" on the airfield with bags of flour. Those who are successful in evasion and attack will receive the traditional reward. After lunch, at 1.30, the University of London Air Squadron will give a demonstration of formation flying, and this will be followed by balloon bursting and more bombing. Warm and liquid refreshments will also be on hand, and a two-seat glider will give joy-rides.

The Club's Cadet is now once again serviceable and will be flying on February 14th. Fixtures for the future include a film show in London, on vintage flying, an "easter bonnet" dance, and more of the club's traditional rallies.

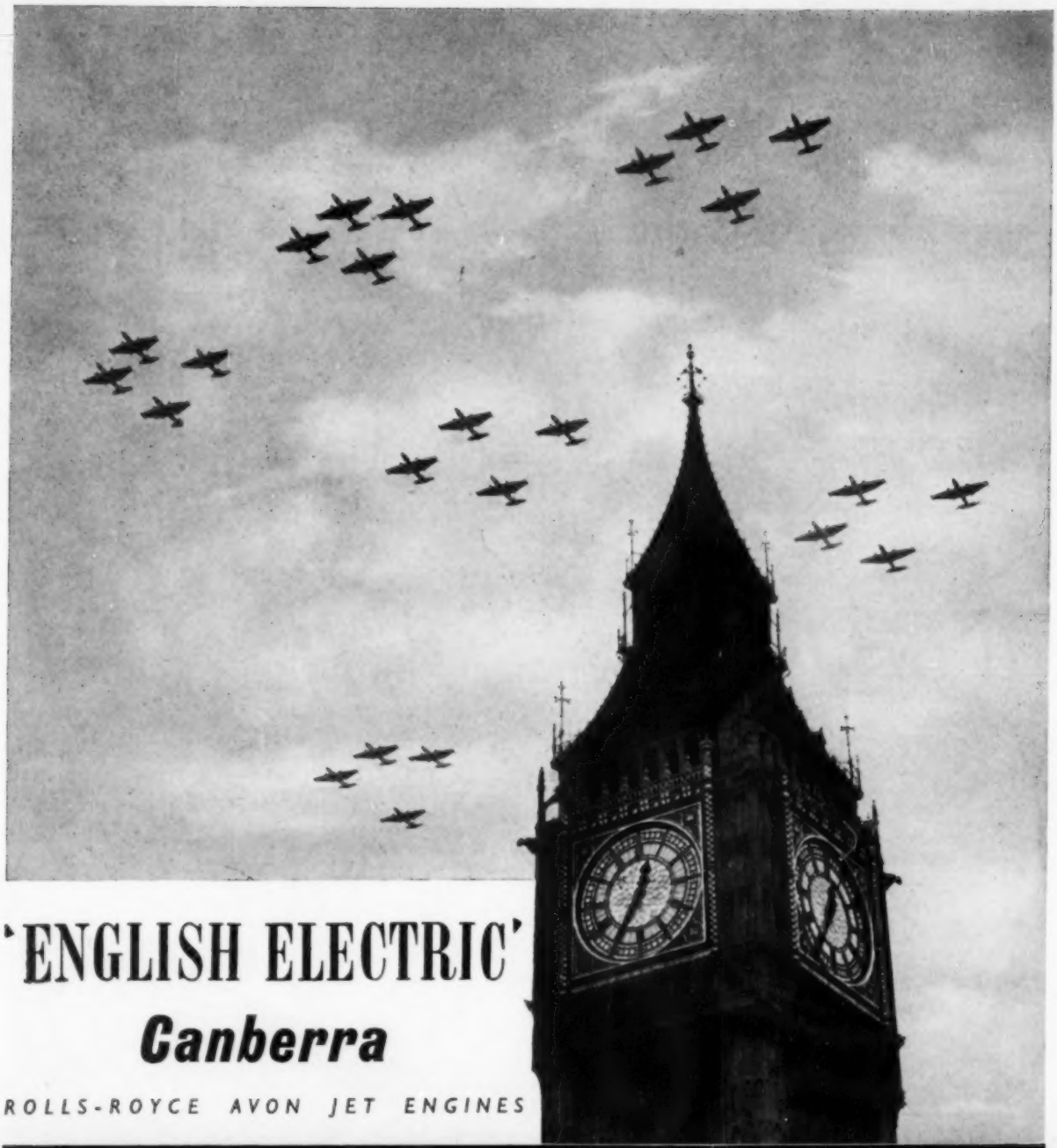
ON Saturday last the Experimental Flying Group of the Popular Flying Club held its fourth anniversary hut-warming party at Redhill aerodrome. Everyone lent a hand to make the party a success—and to see so many young enthusiasts gathered together and talking aviation was reminiscent of the early days of flying.

The Group has two Magisters and a Heath Parasol. Members, of whom there are about 30, pay a monthly subscription of ten shillings and 37s 6d per hour for flying. Four members took their P.P.L.s in 1953. As would be expected, conversation turned largely on the closing of No. 15 Reserve Flying School. The Group is wondering what effect this will have on the use of Redhill—whether, without the school, the remaining elements will be able to maintain the airfield.

A NEW Italian national two-seat glider height record was established on January 16th over Guidonia Airfield, near Rome. An Ambrosini CVV.6 Canguro, flown by Maj. Adriano Mantelli with Lt. Monaco as passenger, was towed to a height of 1,300 m (4,260ft) and cast off. During the next 4 hr 10 min they gained 3,850 m (12,640ft), thus attaining a total altitude of 5,150 m (16,905ft). The new record, which supersedes the previous mark of 2,600 m (8,530ft)—also held by Maj. Mantelli in a Canguro—is subject to confirmation.

Canguros are in production at Ambrosini's main factory at Passignano, near Perugia. Thirty-six have so far been bought by the I.A.F. and the flying clubs, some of them equipped for high-altitude flying. Mantelli's is the fifth record gained by Ambrosini aircraft within forty days; two speed records were set up by the Super S.7 and two more by the F.4 Rondone, on December 5th and 27th respectively.

MINISTERIAL MESSENGER: Mr. R. G. Casey, Australian Minister for External Affairs, with Mrs. Casey and their newly acquired Miles Messenger, in their private landing-field at Berwick, Victoria. Mrs. Casey chose the aircraft, with the assistance of Mr. Keith Shackleton, while she was in England as one of the judges in the International Sculpture Competition. It will be recalled that a fortnight ago we published the Minister's views on the progress of private flying in Australia.



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An architect with an international reputation, Mr. Pitt naturally has to do a lot of flying. And that is why he is responsible for much more building than he knows! For a very simple reason. Mr. Pitt invariably flies British. His fares help to pay for the building of new British airliners (like the VISCOUNT and the BEA ELIZABETHAN). Help to pay men to design and make them. Help to pay airline technicians who can supply the user's point of view when it's needed. In fact, without Mr. Pitt (and the other 1½ million passengers who flew BEA last year) the highly skilled men who have put British aviation ahead would be nowhere. While he and all the others go on flying British, only the sky's the limit.

fly British *keep British aircraft ahead* *fly* **BEA**

INCREASED ENDURANCE is afforded by the newly developed underwing tanks of the Hawker/Armstrong Whitworth Sea Hawk F.1, as shown in this "Flight" photograph. The aircraft belongs to No. 806 Squadron, Fleet Air Arm—the first unit to be equipped with this beautiful and popular Nene-powered fighter.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News

Sir Donald Hardman

AFTER serving for the past two years as Chief of the Air Staff, Royal Australian Air Force, Air Marshal Sir Donald Hardman is returning to Britain to take up his new appointment in May as Air Member for Supply and Organization.

Paying a tribute to Sir Donald's work in Australia, Mr. R. G. Menzies, the Prime Minister, said: "He will be remembered for his influence on the development of the post-war R.A.A.F., particularly for the complete reorganization of the structure of the R.A.A.F. itself and for the reorganization of the Headquarters of the R.A.A.F. in Melbourne. Two of his achievements were the introduction of the Command System on functional rather than geographical lines, and the urgently needed streamlining of the R.A.A.F. administration."

Sir Donald will be succeeded by Air Marshal J. P. J. McCauley, C.B., C.B.E., who, until this new appointment, was A.O.C-in-C. Home Command, R.A.A.F.

Remaining Reserve Schools to Close

IN answer to a question by Sir Walter R. D. Perkins in the House of Commons last week, Mr. George Ward, Under-Secretary of State for Air, disclosed that the remaining Reserve flying schools are all to be closed down. "The Air Council", he said, "have now completed their review of the policy for providing and training the aircrew reserve which would be required to reinforce the Royal Air Force in war. We propose to concentrate on training a smaller number of aircrew reservists to a higher standard of efficiency on the types of aircraft which they would be required to fly in an emergency. This implies training at Service units, and, as there will be no further requirement for civil schools, we shall be reluctantly compelled to close the remaining reserve flying schools within the next five months. The detailed arrangements and dates are being discussed with the firms concerned."

The schools now to go are: No. 5 R.F.S., Castle Bromwich (Birkett Air Services, Ltd.); No. 9, Doncaster (C.L. Air Surveys, Ltd); No. 10, Exeter (Exeter Airport, Ltd.); No. 11, Perth (Airwork, Ltd.); No. 15, Redhill (British Air Transport, Ltd.); No. 19, Woodvale (Short Brothers and Harland, Ltd.); No. 22, Cambridge (Marshalls Flying School, Ltd.).

It is stated that every effort will be made to find alternative employment for the instructors and maintenance personnel affected by this decision. Those suitable will be offered posts in the Royal Air Force and for the rest the Ministries of Labour and Civil Aviation will endeavour to find employment with the airlines and other organizations.

Another Cyprus Airfield

A REPORT from Cyprus states that the R.A.F. is building an airfield about eight miles from Episcopi, on the Akrotiri pensinsula in southwest Cyprus. Episcopi is also the site of a new army base.

New Aircraft Recognition Trophy

A MODEL of the H.P. Victor has been presented by Sir Frederick Handley Page as a trophy for the annual Royal Air Force aircraft recognition contest to be held this year in the Science Museum, London, on January 30th. Fifty three-man teams, drawn from the R.O.C., R.A.F. Commands in the U.K., 2nd T.A.F. in Germany and No. 90 Group, will compete. The competition will consist of 30 lantern slides each exposed for one second followed by 20 at half a second each. A draw will be decided by a further ten held for one-fifth of a second. Last year a team from No. 9 Group (Lancaster) R.O.C. won with 126 points out of a possible 150.

R.A.F. Handling Squadron Tour

A PARTY from the R.A.F. Handling Squadron of the R.A.F. Flying College at Manby, Lincs, is to visit F.E.A.F., leaving England on February 4th, and returning on February 26th. The squadron is responsible for preparing pilots' notes for all new aircraft coming into service and also annually reviews handling of those already in use. Some types operated in F.E.A.F. are no longer in service at home.

No. 2600 L.A.A Sqn. Appointment

THE Air Ministry has announced the appointment of S/L. D. J. M. Howard to command No. 2600 (City of London) L.A.A. Squadron, R.Aux.A.F., at Biggin Hill.

S/L. Howard, who is 36, enlisted in the R.A.F.V.R. at the beginning of the war as a wireless operator/air gunner. He later served in the filter centre at No. 11 Group H.Q., and at H.Q., Air Command, South East Asia. From 1949, until his appointment to No. 2600 Squadron he was with No. 3604 (County of Middlesex) F.C.U., R.Aux.A.F.

Half-yearly Promotions

CONCLUDED below is the list of half-yearly promotions announced by the Air Ministry. Other names from the list appeared in *Flight*, January 8th, 15th and 22nd.

EQUIPMENT, SECRETARIAL AND EDUCATION BRANCHES: *Flight Lieutenant to Squadron Leader.*—E. J. Clelland; P. A. H. Moon; S. R. Roberts, A.F.C.; S. E. Skinner; W. H. Hasselstrom; C. T. Williams, A.F.C.; E. H. Lewis; H. G. Matthews, D.F.M.; R. F. W. Turner, D.F.C.; E. I. Williams; W. M. G. Wing, M.B.E., D.F.M.; T. L. Gillieson; D. F. Baker; R. J. E. High; R. P. Cummins; W. H. Goldstraw, D.F.C.; R. C. D. Vincent, M.B.E.; G. Robson; C. Philpot; G. D. N. Noel-Johnson; D. G. Rogers; N. White, M.B.E.; G. R. Wheeldon,

S.R.A.F. PEMBROKE: One of the four Percival Pembroke C. Mk 1 aircraft ordered for the Southern Rhodesian Air Force at New Sarum Airport, Salisbury. It was flown out from Britain late last year by Capt. E. Cunnison, D.F.C., S.R.A.F.

SERVICE AVIATION . . .

A.F.C.; J. Fifield; G. N. B. Smith; A. W. Scott; M. H. T. Molloy; G. J. Kemp. *Flight Officer to Squadron Officer (W.R.A.F.)*—M. G. Allott; C. Durrant, M.B.E.; I. Cole; A. D. Chiswell; J. McD. Jeffers; S. R. MacPherson; E. M. Benson.

MEDICAL and DENTAL BRANCHES. *Wing Commander to Group Captain.*—A. W. Smith, M.B., B.S., D.I.H.; L. E. A. Dearberg, M.R.C.S., L.R.G.P., D.P.H.; H. E. Bellringer, M.B., Ch.B.; H. Keggin, L.D.S. *Squadron Leader to Wing Commander.*—A. C. Camm, M.R.C.S., L.R.C.P., D.L.O.; M. W. L. White, M.R.C.S., L.R.C.P.

AIRCRAFT and FIGHTER CONTROL BRANCHES. *Squadron Leader to Wing Commander.*—G. W. Kirby; C. P. Waddell. *Flight Lieutenant to Squadron Leader.*—F. J. Chudley, D.F.M.; J. Sanderson, D.F.C.; F. E. Earnshaw; W. H. A. Bradshaw, D.F.C.; G. B. Masters; D. H. Stodard; W. H. Pope; H. Thomas, A.F.C.; J. R. Marshall, D.F.M.; J. C. Inksow; G. M. Shinnie, D.F.C. *Flight Officer to Squadron Officer (W.R.A.F.).*—T. C. Legge.

OTHER BRANCHES. *Squadron Leader to Wing Commander.*—G. Craig. *Flight Lieutenant to Squadron Leader.*—R. H. Fox; B. W. Green; W. M. G. Gosden, M.B.E.

ROYAL AIR FORCE REGIMENT. *Wing Commander to Group Captain.*—A. B. Riall, O.B.E. *Squadron Leader to Wing Commander.*—R. A. A. Dawes, M.C.; D. L. Sladden. *Flight Lieutenant to Squadron Leader.*—J. R. Watt; P. R. Little; G. K. Chapman; R. G. M. Hubbard; C. G. Davies; W. McDean; A. A. J. Hudson.

Reunions

THE annual reunion dinner of R.A.F. Stations Hurn, Harwell and Rivenhall, No. 38 Group and Airborne Forces Old Comrades' Association, is to be held at the Victoria Hotel, Buckingham Palace Road, London, S.W.1, on March 6th. Particulars from Miss L. C. Waters, 14 Lynwood Grove, Orpington, Kent.

No. 25/29 Group (War) officers reunion (R.A.F., W.A.A.F., Commonwealth and Allied) will be held on March 12th at 6.30 p.m. at the Westminster Arms, Page Street, Westminster, London, S.W.1. Remittance of 7s 6d should be sent to 25/29 Group, A.V-M. E. D. Davis, C.B., O.B.E., Room 223, 1st Avenue House, High Holborn, London, W.C.1.

EARL MOUNTBATTEN ON CARRIERS

ON the occasion of his receiving the Freedom of the City of Edinburgh last week, Earl Mountbatten of Burma, in a dissertation on the duties and virtues of the Royal Navy, had these remarks to make about aircraft carriers and helicopters.

"Although I am sure everybody knows that the Royal Navy invented aircraft carriers, how many realize that we have retained the lead in devising means of operating the latest types of aircraft from them? For example, the angled deck—an entirely new scheme for landing the fastest jet aircraft slantwise on a flight deck, whilst retaining the deck park of aircraft on the forward end of the flight deck; or the great steam catapult, which enables the most powerful aircraft to be launched from a carrier whose length of flight deck would otherwise be much too short. Thus the Navy can bring air power to its task of controlling sea communications in war in circumstances when only seaborne aircraft can operate effectively."

Later, after referring to the help given to people in distress in all parts of the world, Earl Mountbatten went on:

"The Navy is admirably equipped to undertake humane jobs of this kind literally at a moment's notice. Naval helicopters, for instance, have not only played an irreplaceable part in jungle operations in Malaya, but were able to give invaluable aid in the floods along the East Coast and in Holland last year, as well as during the terrible earthquakes in Cyprus, and in the Ionian Islands. Some of the ships that went from Malta to help in this last calamity could be equipped with special teams of doctors and medical units, and had special stores put on board before leaving Malta; but others like the cruiser *Gambia*, which was on her way from Port Said and was diverted without any warning, had on board enough of the right equipment, stores and personnel to enable her to help with first aid, medical attention, firefighting, clearing rubble from the streets, repairing power stations, and passing on news to the rest of the world outside the stricken area.

"If it surprises anyone that the *Gambia* should have been equipped for every emergency, as a routine matter, perhaps it is because he has not realized to what extent ships of any size today represent a microcosm of the civic structure that one finds on land. A destroyer has a complement of 250—about the size of a village; whilst a big fleet carrier has a ship's company up to ten times as big—about the size of a small market town. If we look more closely at the social structure of a fleet carrier, we will see that this floating market town contains a parallel to most of the institutions of its land-locked twin.

"First of all we find the doctor; and as an example of the unexpected situations with which the Navy may have to deal, may I remind you that a baby was born on board H.M.S. *Eagle* during the Coronation Naval Review—but a suggestion that the *Eagle* should be re-named the *Stork* was not followed up!

"Then there is the dentist. In 1947 a high official, being taken in one of Her Majesty's ships to one of our dependencies in the Pacific, lost his dentures over the ship's side (when he was ridding himself of his breakfast, one presumes) but was able to deliver a most impressive peroration on landing, next morning, for the dental officer and mechanic had made good the deficiency in the meanwhile. And incidentally, this same ship reported, when cruising in the Pacific Islands, that her dental services were in constant demand by traders, officials, and even missionaries who came from far and wide to have their teeth seen to.

"Next we have the schoolmaster, who, besides taking care of youth and adult education, runs a reference and a recreational library. There is also the parson, with his chapel; and the local cinema, with a really up-to-date programme twice weekly. There is the bakery, the butcher's shop, and the grocer's; there are tailors, bootmakers and barbers; a general store run by NAAFI; a cold storage; a laundry; a garage (for any vehicles that may be carried on board); a bookstall; a stationer's shop, and a post office. There is the police station (and the jail!); and a telephone exchange (with hundreds of numbers); as well as wireless transmitters and receivers; a printing press; and most likely a small local newspaper.

"I must not forget to mention the fire brigade. I told you how they took part in fire-fighting in the earthquake zones; so I can tell you that they surpassed themselves at South Queensferry some years ago, when a fire broke out in the whisky distillery there—arriving on the scene before any of the local fire brigades, in the face of what I think may well have been fierce competition! I hope that virtue was not, on that occasion, its own reward.

"The floating market town I have been describing also has things that market towns do not have. Its own airfield and its own aircraft, for example, its own meteorological station; and it has means of communicating with the outside world by radio-telephone.

"We find it even has its own soldiers stationed on board—in the form of Royal Marines. The Marines have their band—now in their pre-war full dress again—and apart from playing in the local bandstands or concert halls at ports the ship may visit, it often carries out the colourful ceremony of 'Beating Retreat' on shore, as a gesture of goodwill to the local population.

"For an important part of the peacetime activities of Her Majesty's ships consists in 'showing the flag'—not only by visiting ports round the world, but even in one case by lending an aircraft carrier to be specially fitted as a mobile part of the Festival of Britain. In particular when our ships are abroad these typically British towns are bodily transported to some foreign port where local visitors, often in their thousands, are welcomed on board to see this sample of British life. Furthermore it is possible for our libertymen, when they go ashore, to be Britain's best ambassadors."

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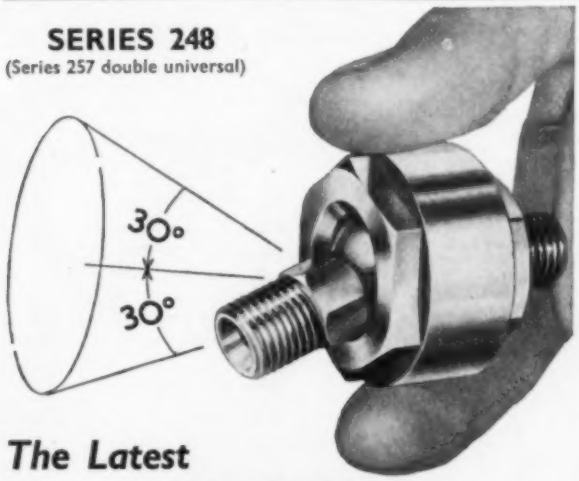

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SENIOR REPRESENTATIVE (A.P.6), DEPARTMENT OF SUPPLY, AUSTRALIA HOUSE, THE STRAND, LONDON, W.C.2

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HOWEVER, it occurs to us that nearly all our clients have a C47 parts catalogue and therefore there seems little point in reprinting same in these columns during the next few months.
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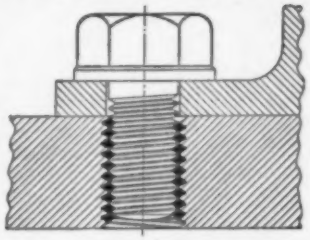

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PUBLIC ANNOUNCEMENTS

AIR TRANSPORT ADVISORY COUNCIL

THE Air Transport Advisory Council give notice that they have received the undermentioned applications to operate scheduled air services:—

Application No. 257 from Airviews, Ltd., of Ringway Airport, Manchester, for a seasonal U.K. internal service with DH89 and Auster aircraft for the carriage of passengers and supplementary freight between Manchester (Ringway) and Isle of Wight (Bembridge) with an intermediate traffic stop at Southampton (on demand), at a frequency of from one to two services weekly during the season from April to October inclusive, for a seven-year period commencing April 1st, 1954.

From British European Airways Corporation, of Keyline House, Ruislip, Middlesex:—

Application No. 258 to re-route twice weekly, via a traffic stop at Naples instead of at Rome, their normal scheduled service between London and Malta on the route set out as Route 31 in Schedule "A," Part II of the terms of reference issued to the Air Transport Advisory Council by the Minister of Civil Aviation on July 30th, 1952.

Application No. 259, to re-route three times weekly via traffic stops at Dusseldorf and Munich instead of at Rome, their normal scheduled service between London and Athens and Nicosia on the route set out as Route 35 in the Schedule described above.

THESE applications will be considered by the Council under the terms of reference issued to them by the Minister of Civil Aviation on July 30th, 1952. Any representations or objections with regard to these applications must be made in writing stating the reasons, and must reach the Council within 14 days of the date of this advertisement, addressed to the Secretary, Air Transport Advisory Council, 9 Buckingham Gate, London, S.W.1, from whom further details of the applications may be obtained. When an objection is made to an application by another air transport company on the grounds that they are applying to operate the route or part of route in question, their application, if not already submitted to the Council, should reach them within the period allowed for the making of representations or objections. [1575

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The engagement of persons answering these advertisements must be made through the local office of the Ministry of Labour and National Service, etc., if the applicant is a man aged 18-64 or a woman aged 18-59 inclusive, unless he or she or the employer is excepted from the provisions of The Notification of Vacancies Order 1952.

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WRITE, stating age and full details, to Staff Officer, Handley Page, Ltd., Cricklewood, London, N.W.2. [1558

DESIGNER/DRAUGHTSMAN required immediately to develop mechanical and electrical instrument equipment. London 15 minutes, station 3 minutes from factory. Frequent bus services.—Write qualifications and experience to Brvans Aeroquipment, 15 Willow Lane, Mitcham Junction. [0609

ASSISTANT instructor required by flying club, London area, for flying and administrative duties. Successful applicant must be conscientious with pleasant personality. Also part-time instructor for weekends and summer evenings. Genuine applications with full personal details must be received before February 12th.—Box 3075. [1585

HANDLEY PAGE (Reading), Ltd., The Aerodrome, Woodley, Reading, have vacancies in their Design Office for senior and intermediate stressmen and for senior, intermediate and junior weightsmen. They are required for work on an interesting new project with good opportunities for advancement.—Please send full particulars of experience, etc., to the Personnel Officer. [0235

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ELECTRONIC engineers educated to degree standard with some practical experience. To assist system and project engineers in the development of electronic and electrical elements. Ref. 401.

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ASSISTANT test pilot required in Midlands for testing overhauled and production jet and piston-engined aircraft. Previous testing experience necessary and instrument rating essential.

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A VACANCY exists for a senior man in the electrical design section of Saunders-Roe, Ltd. Applicants for this post should have good aircraft drawing office experience and qualifications up to A.M.I.E.E. standard. Pension and assurance schemes are in operation and practical assistance will be given with housing. WRITE, giving full details of experience, age and salary expected, to Personnel Officer, Saunders-Roe, Ltd., East Cowes, I.O.W., quoting reference F/1. [1583

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AIRCRAFT or mechanical draughtsmen, all graded and junior aircraft stress and weightsmen required.—Apply, stating age, experience and salary required, to the Chief Draughtsman, Alan Muntz and Co., Ltd., Aircraft Division, Langley Aerodrome, Slough, Bucks. [0368

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DESIGN draughtsman required to work on conversion and repair of aircraft. Must be capable to work on own initiative. Some knowledge of stress analysis an advantage. Salary commensurate with experience and ability.—Please apply to the Personnel Office, Field Aircraft Services, Ltd., Nottingham Aerodrome, Tollerton, Notts. [1556

PLANNING engineers required in newly erected high volume production factory ten miles from Birmingham. A detailed knowledge of all metal removing methods is essential, together with an imaginative approach to all problems of machining and hand finishing operations. Applicants with gas turbine experience preferred.—Box 3004. [1562

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BRITISH MESSIER, Ltd., Cheltenham Road, Gloucester, invite applications for employment from service engineers, one to operate in the Belfast area and one to operate in the Bristol area, on undercarriage and hydraulic work. Permanent position for experienced mechanic of good personality. Reply, giving full details, to the Personnel Manager. [1326

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AIR FORCE, Naval, civil and helicopter aircraft all under design and development at Percival Aircraft, Ltd., Luton Airport, Beds. Applications are invited from senior and junior draughtsmen and stressmen for work on this interesting programme. Good welfare facilities, including staff pension scheme.—Write, giving details of experience and salary required, to Personnel Manager. [0595

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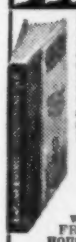

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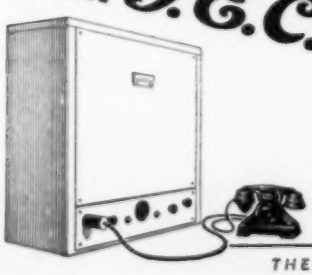

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